



US Army Corps
of Engineers
Rock Island District



Archives Search Report

FINDINGS

for the former

PORT ANGELES COMBAT RANGE

PORT ANGELES, WASHINGTON
PROJECT NUMBER F10WA003301

SEPTEMBER 1996



DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
for
FORMERLY USED DEFENSE SITES

FINDINGS

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR THE FORMER
PORT ANGELES COMBAT RANGE
PORT ANGELES, WASHINGTON
PROJECT NUMBER F10WA003301

SEPTEMBER 1996

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1. INTRODUCTION

a. **Subject and Purpose**

(1) This report presents the findings of a historical records search and site inspection for the presence of ordnance and explosives (OE) located at the Former Port Angeles Combat Range, Port Angeles, Washington (see plate 1 for general location map). The investigation was performed under the authority of the Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP FUDS).

(2) The investigation focused on 1,600 acres(+/-) that were used as a ground-to-ground firing range by the 115th Cavalry during 1942 and 1943.

(3) The purpose of this investigation was to characterize the site for potential OE contamination, to include conventional ammunition and chemical warfare material (CWM). The investigation was conducted by experienced ordnance experts through thorough evaluation of historical records, interviews, and on-site visual inspection results.

b. **Scope**

(1) This report presents the site history, site description, real estate ownership information, and confirmed ordnance presence (prior to and after site closure), based on available records, interviews, site inspections, and analyses. The analyses provide a complete evaluation of all information to assess current day potential ordnance contamination, where actual ordnance presence has not been confirmed.

(2) For the purpose of this report, OE consists of live ammunition, ammunition components, CWM or explosives which have been lost, abandoned, discarded, buried, fired, or thrown from demolition pits or burning pads. These items were either manufactured, purchased, stored, used, and/or disposed of by the War Department/Department of Defense. Such ammunition/components are no longer under accountable record control of any DOD organization or activity.

(3) **Expended** small arms ammunition (caliber .50 or smaller) is **not** considered OE contamination. OE further includes "explosive soil" which refers to any mixture in soil, sands, clays, etc., such that the mixture itself is explosive. Generally, 10 percent or more by weight of secondary explosives in a soil mixture is considered explosive soil.

2. PREVIOUS INVESTIGATIONS

a. 1993 Preliminary Assessment

A Preliminary Assessment (PA) of the Port Angeles Combat Range was conducted under the Defense Environmental Restoration Program, Formerly Used Defense Sites (DERP FUDS) by the U.S. Army Corps of Engineers, Seattle District (CENPS) in 1993 (Site Number F10WA003300). At that time, it was determined that the 1600 acre site (+/-) was formerly used by the U.S. Army and was eligible for restoration under the purview of DERP FUDS. Due to its use as a training range by the 115th Cavalry, an OE project was recommended, which is the subject of this report (see document E-1). Table 2-1 represents an overview of this assessment.

TABLE 2-1 DERP-FUDS PRELIMINARY ASSESSMENT PROJECTS				
Project Number	DERP Category	Present Phase	Comments	Location
F10WA003301	OE	SI	Ordnance or explosives contamination	Entire Site (see plate 1)
	HTRW	-	None Recommended	
	BD/DR	-	None Recommended	

b. 1986 Range Clearance Technology Assessment

(1) This assessment was prepared by the Naval Explosive Ordnance Disposal Technology Center, Indianhead, MD for HQ, U.S. Army Corps of Engineers, Washington, D.C. It focused on economic, legal and safety aspects of performing a range clearance operation on subject site. It addressed current and future technologies in relation to cost and clearance effectiveness (see reference B-4).

(2) It was concluded that "Additional mechanical clearance of the range is environmentally, technically and economically unfeasible at this time or in the foreseeable future.", but recommended that current land restrictions "remain in force" (see document E-3).

3. SITE DESCRIPTION

a. Existing Land Usage

(1) The former Port Angeles Combat Range is located about seven miles southeast of the city of Port Angeles, Washington in Clallam County. It is accessed by Highway 101 into the general area, with an improved road known as Deer Park Road leading to the northeast corner of the range and following along the eastern boundary of the site. Access into the site along this road is restricted by a barbed wire fence with actual site movement being limited to foot. A few deteriorating signs can be seen along this road warning the public of its former use as a training range (see photo J-12). Access from any other direction is somewhat limited to a few jeep trails or restricted to foot travel through the Olympic National Park to the south, or heavily wooded private property to the north and west.

(2) A large portion of the site is currently owned by the City of Port Angeles and maintained as a Water Shed. Some cattle grazing is permitted by the city in this area which includes almost all of the open area where the firing line and target area existed (see document L-1).

(3) The land surrounding the open range area is predominantly wooded and not used for any significant purpose, except where portions have been determined to be safe for logging with no chance of shrapnel being embedded in the trees (see photo J-1).

(4) Table 3-1 below shows the various areas detailed within this site and the current owners (see plates 4, 5 & 8).

TABLE 3-1 CURRENT LAND USAGE					
AREA	FORMER USAGE	PRESENT OWNER	PRESENT USAGE	SIZE/ ACRES	COMMENTS
A-1	Direct Fire Impact Area	City of Port Angeles	Water Shed (Wooded)	85	See photo J-2
A-2	Direct Fire & Combat Trng Area	City of Port Angeles	Water Shed, Grazing	40	See photos J-3 & J-4
B	Indirect Fire Impact Area	City of Port Angeles Manke Lumber	Water Shed (Wooded) Timber/Unused	370	See photo J-7
C-1	Buffer Zone	City of Port Angeles Manke Lumber Green Crow Olympic Park	Water Shed (Wooded) Timber Timber Hunting/Hiking	850	See photo J-8
C-2	Buffer Zone & Combat Trng Area	City of Port Angeles	Water Shed, Grazing	20	See photos J-4
D	Combat Trng Area	City of Port Angeles	Water Shed, Grazing	40	See photos J-11 & J-13
E	All Remaining Land (FDE)	City of Port Angeles Private Olympic Park	Water Shed (Wooded) Undeveloped Hunting/Hiking	222.87	See photo J-14
F	Impact/Buffer Area (add. acreage)	City of Port Angeles Private Olympic Park	Watershed (Wooded) Undeveloped Hunting/Hiking	960	See photo J-8
Area acreages are approximate				1627.87 (FDE)	
				960 (add. ac.)	
				2587.87 TOTAL	

b. Climatic Data

(1) The former Port Angeles Combat Range area weather is tempered by winds from the Pacific Ocean. Summers are fairly warm, but hot days are rare. Winters are cool, but snow and freezing temperatures are not common except in higher elevations. Overall, the sun shines about forty-five percent of the time in winter, and twenty percent of the time in the summer.

(2) The mean annual temperature of the area ranges from about 42 degrees Fahrenheit to 57 degrees Fahrenheit. The winter average temperature is 41 degrees and the summer average is 59 degrees. The average daily minimum for winter is 35 degrees. The lowest temperature recorded for the Clallam County Area was 4 degrees, recorded at Forks on December 29, 1968. The highest recorded temperature, also recorded at Forks, was 101 degrees.

(3) Rainfall occurs mainly in the months of October through March, peaking in a December and January average of about four inches. The yearly average is about twenty-five inches. The average seasonal rainfall is six to eight inches.

(4) Prevailing wind is generally from the southwest. Average wind speed is highest, 8 miles per hour in winter. In most winters, one or two storms bring sometimes damaging winds.

c. Topography

The Terrain at the Port Angeles Combat Range is within the area known as the Olympic Peninsula. The majority of the site is located north of the Olympic National Park and slopes upward from north to south. A small portion is located within the northern boundary of the Olympic National Park. The land is hilly and semi-mountainous and covered with second growth of fir and alder, except for the few level, cleared areas of grassland/meadowland. The south half of the site is steep, semi-mountainous land with poor access. The north westerly half of the site is deeply cut with ravines. The northeast portion is comparatively level, and is the only area of good access in the facility, the majority of which makes up the area used as the actual firing range (see photo K-1).

d. Geology and Soils

(1) The region is underlain by sedimentary and igneous rock originally deposited beneath the Pacific Ocean as much as 50 million years ago. Interaction between continental and ocean plates uplifted this bed rock, resulting in land formations. This bed rock and subsequent glacial deposits became the parent material for the soils in this area.

(2) The soils in the identified impact areas are Neilton and Pudget silt loam. Other soils within the site and surrounding the impact area include Elwha and Terbies soil units.

(a) The Neilton soils within the impact areas are terraced, very deep and excessively drained with slope ranges from 0 to 5 percent. The soil profile is typically a mat of organic material 1 inch thick, a surface layer of dark brown very cobbly sandy loam 6 inches thick and soil of dark yellowish brown extremely cobbly sand 10 inches thick. The substratum to a depth of 60 inches or more is dark yellowish brown and olive brown extremely cobbly sand.

(b) Other portions of the site contain Neilton soils of 30 percent to 70 percent slopes and 5 to 30 percent slopes, varying in profile from description in preceding paragraph only by the depths of various layers. Surveyor Creek, a notable geographic feature within this site, traverses Neilton soil terrain with 30 to 70 percent slope.

(c) Pudget soils are very deep, poorly drained, terraced and located in flood plains. Slope is 0 to 3 percent. The soil profile is typically a surface layer of dark brown silt loam about 9 inches thick and a 60 inch deep or more substratum of grayish brown silty clay.

(d) Terbies soils are well drained and found on mountain sides. The soil profile is typically a mat of organic material 2 inches thick, followed by a surface layer of dark brown very gravely sandy loam 3 inches thick. Below this lies a 20 inch layer of yellowish brown very gravely sandy loam and extremely gravely sandy loam followed by 10 inches of yellowish brown extremely channery loam or very gravely silt loam. The substratum is light olive brown

extremely channery sandy loam 12 inches thick. Sandstone is at a depth of 45 inches. Depth to bed rock ranges from 40 to 60 inches or more.

(e) Elwha soils are moderately deep, moderately well drained on hills, formed in a glacial till. The soil profile layer is typically a mat of organic material 2 inches thick, a surface layer of brown gravelly sandy loam 4 inches thick. The subsoil is dark yellowish brown gravelly sandy loam 29 inches thick. Compact glacial till ranges from 20 to 40 inches.

e. Hydrology

(1) The site is drained by Surveyor Creek, which runs off Morse Creek, through the central portion of the site. A small creek known as Frog Creek runs off Surveyor Creek along the northeast portion of the site. They flow in the general direction of south to north.

(2) Within the southeast corner of Section 5, there also exists an area specifically cited for hydraulic soils, with a portion actually being noted as wetlands (see documents I-2 and L-2).

f. Natural Resources

(1) The natural vegetation in the area consists largely of fir, spruce, alder and hemlock trees, which constitutes the valuable logging industry of the area.

(2) Conversations with the area County Extension Office and the National Park Service environmental personnel, along with review of Environmental Impact Statements and reports from the Natural Heritage Program, indicate there is no confirmed existence of any endangered plant or animal species within the project site. However, it has been noted that complete surveys of the area have not been done, and it is likely that at least some of the state threatened or endangered wildlife species would occur in a transient mode. Threatened and endangered species most likely to occur within the site have been included in Table 3-2 on the following page. Additional information on sensitive species or endangered species not likely to occur within the site can be found in document E-2.

(3) There is also a designated wetland area within the site as noted in paragraph 3.e. above. Its basic location, which lies within the main impact area of the site, is indicated on document L-2.

g. Historical/Cultural Resources

There are no specific historical or archeological sites located within the former site as defined by the State Historic Preservation Office (SHPO). However, it has been noted in conversations with local historians and in reports that the Elwah Indians may have moved through the area, which could mean that undiscovered archeological sites could exist. Therefore, any intrusive measures taken within the area will require oversight by the SHPO and/or other like organizations.

TABLE 3-2 NATURAL & CULTURAL RESOURCES		
Resource Classification	Type	Comment
Wildlife	Bald Eagle	Threatened (State & Fed)
	Peregrine Falcon	Endangered (State & Fed)
	Spotted Owl	Threatened (State)
	Marbled Mirrullette	Threatened (State)
Plants	Showy Stickseed	Endangered
	Long-bearded Sego Lily	Threatened
	Clustered Lady's Slipper	Threatened
	Twayblade	Threatened
	Adder's-tongue	Threatened
	Fringed Pinesap	Threatened
	Thompson's Clover	Threatened
	Clackamas Corydalis	Threatened
	Giant Trillium	Threatened
Wetlands		See document L-2
Historical	None sited	Coordinate w/ SHPO
Archeological	None sited; Indian artifacts possible	Coordinate w/ SHPO, See document I-9
Information Sources: B-5, I-2, I-8, I-9		

4. HISTORICAL ORDNANCE PRESENCE

a. Chronological Site Summary

(1) In early 1943, the 115th Cavalry Squadron (mechanized) requested that land be leased in sections 4, 5, 8, 9, and 17 of T29N, R5W, for use as a combat range. It was intended that the Class A range be used for tactical firing problems and short range known distance firing (200-300 yds) (see document F-1 and plate 2).

(2) Through leases and use permits, 1600 acres (+/-) were obtained within sections 5, 8, and 17 (see document L-3).

(3) The range was cited for use of 37mm and 75mm ammunition and small arms (see document F-2), however, there are indications that mortars and land mines were also employed at the site.

(4) No buildings or improvements to the site were made other than a simple spotting tower. Troops that were encamped at the Port Angeles Fair Grounds/Conservation Corps Camp would travel to and from the combat range each day for training.

(5) In April and May of 1944, the range was declared excess, and all leases and permits were canceled. There is no information to suggest that any attempt was made by the Army at the time of closing to clear the range area prior to its return to private ownership. Further, they did not attempt to disseminate the actual use of the former range in terms of the potential hazards that could remain.

(6) In August of 1948, two boys were killed when sawing some downed timber within the former range area. A live 37mm shell that was embedded in the log they were sawing exploded. This incident prompted the Army to take immediate action to dedud the area.

(7) A quick determination (guess) at the area expected to be contaminated was made, and on 7 May 1949 a Certificate of Clearance was issued noting that approximately 775 acres had been cleared of dangerous/explosive material (see documents E-5 and L-3).

(8) Subsequent clearances occurred in 1952, 1955, 1956 and 1957, with deduinding actions culminating in the proposed reacquisition of 652 acres in 1958 determined to be the probable area of contamination (see document L-4 and plate 3). This acreage was ultimately purchased in the early 1960's and retained until 1967 when it was transferred to the City of Port Angeles and Mr. Raymond Diehl. Records indicate that the quitclaim deeds included a "surface use only" and indemnity clause (see documents G-4 and G-5).

b. Ordnance Related Records Review

(1) Research efforts for the former Port Angeles Combat Range began with a thorough review of all reports, historical documents and reference material gathered during the archives search. During this review, an effort was made to focus on areas of confirmed and/or potential OE contamination.

(2) A good collection of documents, including drawings, maps, technical ordnance data, real estate documentation, correspondence, and various other records appropriate to the range and/or that era was been located. The information from these documents was very useful in terms of assessing potential and actual OE contamination at the former Port Angeles Range.

(3) A 1939 aerial photo was obtained that proved invaluable in the final evaluation of the site. Because this portrayed the lay-of-the-land just prior to its use, it allowed for a common sense approach to be applied to some of the documentation on site layout and usage (see photo K-1).

(4) General correspondence was located that discussed the acquisition of the range and its intended use (see documents F-1 & F-2). The original request for the land was accompanied by a sketch of the basic firing fan and the land needed. While document F-1 indicates that Sections 4, 5, 8, 9, and 17 were required (which is consistent with the sketch), document L-3 showing the original site boundary does not include sections 4 and 9. The documents state that the range is to be used for "tactical firing problems and short range known distance firing (200-300 yds) Class A." The proposed coordinates of the firing point and direction of fire were also given (see plate 2).

(5) A Report of Investigation was located which completely detailed an incident that resulted in the death of two young boys when a (37mm) shell exploded that the boys had located embedded in a tree during logging activities (see document E-4). In addition to the information about the accident, this report also contained various pieces of information that aided in the evaluation of the site.

(a) The investigator notes that the pile of downed logs near the accident scene "...were scarred from shell fire and small arms. Also, many of the trees standing in the area had been scarred and some had the tops shot out." Plate 6 and document L-3 depict the approximate location of this accident.

(b) During an interview with a Port Angeles lawyer, he states that the U.S. was negligent in abandoning the site "... without giving any warning to the residents of the area as to its potential danger."

(c) The incident report indicates that just prior to the accident, the two boys showed their brother-in-law "a round iron object about an inch and a half in diameter and about six inches long.... He supposed it to be a harmless shell." Other interview information includes statements of "practice land mines" and "other shells" being found in the area since the accident. One person identified a found shell as being "a round black cylindrical object about an inch and a half in diameter and about six inches long." (a description consistent with a 37mm AP round).

(d) Finally, interview information indicates that the timber within the SW quarter of the SE quarter of Section 5 and the NW quarter of the NW quarter of Section 8 (see plate 4) would not be taken by area mills because of the presence of "shell fragments and small arms" and "metal and explosives".

(6) Various records were located indicating that the U.S. Army had performed numerous clearance sweeps within the range after the range had been exsessed and returned to private ownership (see documents E-5 thru E-9 and Table 4-1). This series of clearances was prompted by the Swagerty accident in 1948. These reports consistently confirm that live ordnance exists within the area, with four of the five reports recommending "Surface Use Only" (SUO) of the range area. The final documented clearance in 1957 further notes that "Reconnaissance of the balance of the range...reveal that any or all of the approximately 776 acres... may be contaminated with explosive duds. A further search of the area could not result in a "free and clear" certificate of clearance." It recommends that the range be purchased by the Government and subsequent use limited to SUO.

TABLE 4-1
PORT ANGELES CLEARANCE SWEEPS

Date	Performed By	Acres	Items Recovered	Type Inspection	Comments
7 May 1949	9800th TSU-CE Det #15	775	"Dangerous &/or explosive material"	Surface w/ mine detector sweep of impact area	Due to use of HE and wide dispersity of fire - "SUO" (see document E-5 & plate 3)
22 Sep 1952	9800th TSU-CE Det #8	10 (Peterson property)	None	Surface w/ mine detector sweep of target areas	Despite no ordnance or scrap being found, "SUO" should remain in place (see document E-6 & plate 3)
22 Nov 1955	9800th TSU-CE Det #5	1600+/-	Unknown	Surface	All but 1+ ac OK for any use (see document E-7 & plate 3)
24 Sep 1956	170th Ord Det Ft. Lewis	.71	26-37mm, M51, solid rd 1-37mm, M63 HE 4-rusted bodies M51 type fuze 3-rusted fin frag of 81mm mortar	Sub-surface to 12" depth	No recommendation made (see document E-8 & plate 3)
22 Mar 1957(?)	548th Ord Det (EOD)	.71	"dangerous &/or explosive materials"	"careful search"	This and remaining 776 ac SUO (see document E-9 & plate 3)

(7) A series of documents was located that discussed a damage claim made against the U.S. Government for crop loss on the Little property due to the restricted use placed upon it. While the claim in and of itself is not significant, this memo and accompanying interviews provided several pieces of information that proved helpful in the ordnance evaluation of the site (see documents F-3 and L-3).

(a) Mr. Little had received a letter in 1953 indicating his property was potentially contaminated and recommended restricted land usage. When he later filed a claim for crop loss, it was determined that he was not really located on a part of the former site that could be contaminated (see plate 3). It was stated that "...the certificate (drawing) recommending restriction to surface use was somewhat ambiguous in indicating the contaminated area...." which caused him to erroneously be sent the letter. This statement proves important when trying to evaluate conflicting information, i.e., the different areas cited as "probable limits of contamination" on documents L-3 and L-4.

(b) In proving their case, the Government secured statements from several of the surrounding residents that were there during site use. Document F-2 was used to reference the location of these persons property within the site. Statements used to determine/verify site usage and layout were as follows:

[1] David C. Reid: "The observation tower shown on the map was south of the line of Little's property, in the northwest corner of the 40 that Yerkes then owned in Section 5." "...They were firing in a southerly direction..." "One of the targets was located on Yerkes 40 but...(it) showed little or no use." "There were also many smaller targets-logs, dummies, etc., on our land."

[2] Anna Pelikan: "At no time...was any use made of the Schier property, now owned by Elbert J. Little." "The target tank was on the Peterson land (formerly Yerkes)...where there was a row of trees."

(8) Document F-4 indicates that in 1954 it was finally determined that the Government should take steps to lease the potentially contaminated lands and post signs restricting public access. These efforts were apparently

unsuccessful, and by 1960 numerous claims had been filed against the Government (see document F-5).

(9) A Real Estate Planning Report prepared in 1961 (document G-1) was beneficial in pulling the picture together through this 1954-1960 time frame. It noted that when efforts to lease were unsuccessful, another clearance was conducted in 1955 which concluded that the land could be used for any purpose except 1+ acre! However, warning signs were apparently still posted which raised public question, so yet another clearance was conducted in 1957. This clearance concluded the site should be "SUO" and recommended that the Government purchase the property.

(10) A 1961 Real Estate Utilization Inspection Report (document G-2) was prepared indicating that consideration of purchase was finally being addressed. While this document supports and follows the progression of the site, it also contains a statement that "...there are no warning signs existing along main access road (Deer Park Road) bordering east edge of installation." This indicates that signs either fell down or were taken down between 1955 and 1961.

(11) Document G-3, Tract Register, simply confirms the final purchase date (1963) of the area considered the "probable limit of contamination". This is consistent with the Real Estate Drawing dated 1958 (see document L-4). However, the original sketch of the "probable limit of contamination" dated 1948 represents a larger area (see document L-3). The 1948 drawing was apparently the area sweep/cited in the 1949 clearance of 775 acres. Yet, by 1958 the actual area purchased/leased had been decreased to 652 acres. There is no documentation that suggests why or when this decrease in area occurred.

(12) Document E-10 is a Report of Reconnaissance Inspection dated 1965 that shows that after only two short years of actual reacquisition of 652 acres, it was considered unnecessary property to the Army and should be disposed of. It notes that the range "...did not receive a high concentration of explosive projectiles, nor is it contaminated to the extent that it requires fencing." It did however recommend annual inspection of the restricted area for three years and the posting of warning signs. The recommended sign to be used, which is included in document

E-10, states "...unexploded **BOMBS** or shells may remain....", clearly indicating a generic approach, as there is absolutely no information to suggest the use of bombs at this site.

(13) Based on the recommendation of the above stated reconnaissance report, a series of correspondence was located that followed the process of final approval of site disposal (see document F-6). Generally, the correspondence outlined the steps taken over time to reach this point, which basically supported or clarified other information/documentation. It also contained one piece of information that was not defined elsewhere, which proved helpful in the final assessment of site contamination. Page two of the original memorandum refers to the 1952 clearance/inspection. It notes that "...the particular portion of ten acres (in the SW1/4, SW1/4, Section 4) was searched thoroughly and no scrap was found." The actual report/certificate located for this clearance did not give the location of this 10 acres, which, without this comment, would most likely have been assumed to have been in Section 5!

(14) Documents G-4 and G-5 are the 1967 Quitclaim Deeds (QD) transferring the property to the City of Port Angeles and Raymond Diehl, respectively. The greatest significance of these documents is that all the acreage was transferred with the following restrictions and clauses:

[a] "Restriction limiting uses which would preclude any tilling or excavating of the ground or harvesting of timber."

[b] "...the grantee herein covenants and agrees for itself, its successors or assigns, to assume all risk for all personal injuries...and agrees to indemnify and save harmless the United States of America,...."

[c] "Reserving to the United States of America, the right to inspect the property...annually for a period of three (3) years...for the purpose of detecting and removing contaminated material."

[d] "Reserving to the United States of America the right to post warning signs and legibly maintain them on the perimeter of the property...."

(15) A 1989 Memo was obtained that notes a discrepancy on the Diehl QD. While the deed represented as document G-5 is the one on file in GSA and Corps records, it was later found that the RECORDED DEED did NOT contain the hold harmless clause (see document F-7).

(16) Various references and documents were obtained that, while not site specific, were very useful in the final evaluation of the site. They included general information on the Cavalry during WW II, and more precisely, the Cavalry Reconnaissance Squadron (mechanized), to include the TO&E (see documents D-1, D-2 and F-8). Also obtained was a WW II era training manual that aided in the evaluation of site layout and usage (see document D-3).

c. Interviews with Site-Related Personnel

(1) Efforts were made to talk to persons knowledgeable about the site in terms of current day information and also those that were on-site during its actual usage.

(2) Several EOD units, area police departments, and the sheriff were interviewed in order to determine if any calls had been received concerning an ordnance presence on site. In each case, the replies were the same. No one had any knowledge or record of ordnance being found within the former site (see Appendix A).

(3) Mr. Ron Johnson, the City Engineer, escorted the team to the portion of the site now owned by the city. He explained that to his knowledge, no one has found anything on the property (ordnance), but noted that the city only maintains the area as a water shed, and rarely has reason to traverse the area. Some of the area is leased out for grazing, but again, he was not aware of the leasee finding any ordnance either. Other than some general information about the area/land, Mr. Johnson had no other information dealing with the former site usage (see document I-2).

(4) Mr. Raymond Diehl, Ms. Marian Diehl-Hanson, and Mr. Ed Schreiner are all current owners of property that was originally a part of the 1958 site boundary. Mr. Diehl's father had purchased the 32 acres on the east side of Deer Park Road, portions of which are now owned by the

three individuals interviewed (see plate 4). In each case, these persons indicated that they have never seen any signs of ordnance on their property. Mr. Schreiner even noted that he had done some excavating on his land down to one or two feet. Mr. Diehl further noted that his father was convinced that all the action was on the west side of the road, and ultimately had GSA remove the restriction to his land. All three persons had only hearsay information on range use; they fired south/southwest, toward the mountains, and they heard two kids/men were killed by a live round (see documents I-3 & I-4).

(5) Mrs. Joe Baron and her son Ron were interviewed. The Barons had leased property for grazing that was a part of the former range (see plate 4). While Mrs. Baron noted that she did not move into the area until 1959 or 1960, she did have information about the range that was apparently passed on to her by friends that lived there during site usage. She stated that the firing was done on the west side of the road in a south/southwest direction. She said no buildings were put up by the troops (except a latrine), and she recalled the only buildings in the area being an old barn and the old school house. She knew of the two boys that had been killed (Swagertys) and stated that a friends father was part of a team that walked the site arm-in-arm after site closure to clear the area. She had not ever found ordnance there, but her son, Ron said that he and friends often scavenged the area and saw lots of .30 '06 embedded in trees. He only once remembered finding something larger than small arms and guessed it to be about 40mm (probably 37mm). He said that he wasn't overly familiar with ammo, but that a friend that was with him at the time said it wasn't live. He couldn't remember exactly where he had found this, as it was 20 or 25 years ago, but said that generally it was far south of the cleared area (see documents I-5 & I-11).

(6) Several persons that actually lived in the area of the site during its use were located. In each case, the information obtained was generally consistent with other site information; the direction of fire (south/west), the fact that they did not fire across the road, no construction or existence of military buildings, and the Swagerty accident.

[a] Ms. Florence Bailey was a teenager living on the road the troops used each day on their entry into and out of the site. She explained that groups of soldiers camped at the fair grounds for two week blocks, and would come down to practice around 9:30 AM and leave around 6:00 PM. She noted they fired toward the mountains, somewhat in line with the orchard (see photo K-1) and indicated that she did not recall them closing Deer Park Road during practice. She cited a latrine that sat on the west edge of the range, north of the orchard. She also recalled seeing them practice crawling under barbed wire in the middle of the field. She also stated that she only remembered them firing at old tanks. She stated that she couldn't recall any effort to clean up the site until after the Swagerty boys were killed (see document I-6).

[b] Mr. Harold Winters also grew up in the area during the time the range was in use. He too noted the direction of fire as toward the orchard. He said that there was a block and cable that pulled old tanks across the field for them to fire at. He stated they used anti-tank guns firing 37mm and 75mm and recalled use of small arms also. When asked about use of mortars, he said he had no recollection of that being used. He too, like Ms. Bailey, made specific note of the latrine being at site, and also noted that the troops camped at the fair grounds and came down each day to practice. When asked about any possible information on remaining contamination at the site, he knew of nothing and noted that his brother has plowed in the area (which was not precisely defined) and never hit anything (see document I-7).

[c] Mr. Thomas Tinkham also grew up in the area. Mr. Tinkham went to school with the Swagerty boys. He stated he thought they fired across the road. However, he said he did not know or remember it, but had deduced it because he knew the location of the Swagerty accident on the west side of the road, and was also aware that there was a deed restriction on the Schreiner property on the east side (see plate 4). He stated that he had done excavating work on the Schreiner property and never saw any signs of ordnance or ordnance debris (see document I-13).

[d] The O'Neal family owned land near the site before the range became active and still owns land today. Mr. Frank O'Neal was interviewed and stated that the

firing was on the west side of the road toward the south. He noted that he and the Barons boy were good friends and did a lot of scouting in the area. He said there was a lot of scrap metal and bullets in the old trees south and west of the orchard (see document I-18 and plate 6).

[e] Mr. Lewis Tucker and Mr. Don Barker were also local residents during the time frame the site was used, but in both cases, because the men had served in the Army, they were not around during much of its actual use. The little information the men had was consistent with that given by Ms. Bailey and Mr. Winter, i.e., location/direction of fire. Mr. Winter did remember warning signs being posted but was not sure if they were still around. When asked if he ever found any ordnance in the area he said no, "but that was because I was smart enough to stay out of the area." Mr. Barker also had no direct information of ordnance being found in the area other than his knowledge of the two boys that had been killed (see documents I-6 & I-12).

(6) Various employees from the National Park Service were interviewed. With the exception of Mr. Schreiner, they had no knowledge of ordnance being located in the portion of the Olympic National Park that was once a part of the original site. In fact, Mr. Paul Gleeson and Ms. Jane Hendrick were surprised to learn that a small portion of the park was even a part of a former firing range. When asked about the particular area, it was explained that it was fairly rough terrain in that area, and that the only time it would be entered by people was probably during the two months of deer hunting season. However, Ms. Hendrick noted that the deer population is small, and guessed that we may be talking 8-10 persons per week at most. While each of these persons had no information on the range, they provided a great deal of valuable historical information concerning the area, its natural and cultural resources (see documents I-4 & I-9).

(7) Several persons that were in the 115th Cavalry during WW II were contacted in order to obtain specific information regarding actual training at the site and general information on the history and training practices of the 115th Cavalry. While two persons were unable to provide any helpful information, other than the fact that one person remembered firing rifles at the site (see documents I-14 and I-15), several others proved to be valuable sources.

[a] Mr. Jake Benshoof, a former member of the 115th Cavalry during WW II, was active in the Port Angeles area but was not familiar with the subject site. He said he spent his time patrolling the coast area. He was however, able to confirm and explain some general facts about the unit which aided in evaluating the site. He stated that the ordnance his unit had on hand at the time (he equated to November 1942), included 37mm, 75mm, .45 cal., .50 cal., and .30 cal. When he was told there was evidence of 81mm mortars on site, he said they never had mortars, and suggested that possibly the 41st Infantry Division that was nearby could have used the range. When told that 37mm HE had been verified on site, he was surprised. He stated that the 115th occasionally used AP, but rarely used HE for training, mostly only practice. He confirmed information contained on the TO&E (documents D-1 & F-8), and stated that finding National Guard records concerning the site would be tough because there were a lot of changes going on and the records were most likely lost (see document I-10).

[b] Mr. George Welch was in the 115th and had trained at Port Angeles Combat Range. He stated that they only fired 75mm (howitzer, self propelled) when he was at the site. It was all indirect fire based on using coordinates. He indicated that he couldn't remember the direction of fire, but remembered that once they were 100 degrees (or mils) off and hit a barn to the left. He didn't remember firing across a road, but said he did recall a cleared area that they fired in, but noted there were no targets per say, since they just fired from coordinates utilizing forward observers. As for distance, he felt like (but was uncertain) it may have been about 1500 yards or so, because he seemed to remember pulling out some of the increments before firing. He said they fired mostly HE, but he thought they used some WP too. He further stated that they came in on a daily basis to practice and there were no structures (see document I-16).

[c] Mr. Ronald Geisick was also a member of the 115th Cavalry during WW II that had trained at the subject site for about a month or so. He stated that during his training at the site they only used 37mm. He said they did both direct and indirect firing. They too camped at the Conservation Corps Camp outside Port Angeles and came in each day to fire. While he wasn't sure of the direction of fire, he thought it to be from east to west, more or less. But he did state he didn't fire across any road. In terms

of target specifics, he recalled both moving and stationary targets. He noted they pulled an old tank across the field on a block and tackle for direct firing. He guessed at maybe 500 or 600 yards. He said that when they did direct firing, sometimes they lined up 19 tanks at the firing line and they all fired together. It was different for indirect firing, they used coordinates. He said they used mostly ball (TP), and maybe AP once just to get the feel of it. He said he doesn't remember ever using HE. When the interviewer noted that a local had stated the troops entered the site through the fence along the road and set up their firing line fairly near the entry point, he agreed this sounded like what he remembered. He further stated that the only training they did was firing and that there were no buildings at site (see document I-17).

[d] Mr. William Callahan, member of the 115th Cavalry, Wyoming National Guard provided information regarding the unit during the time frame the range was in use. He cited use of the M8 Motor Carriage (75mm Howitzer), and M3/M5 light tanks which mounted 37mm guns and .30 cal. machine guns (see document I-19).

(8) Various persons were contacted that were able to provide general information about the area. While they did not have any first hand knowledge of site usage or ordnance, they did provide information that was indirectly helpful in the final assessment of the site (see documents I-1 and I-8).

5. SITE ELIGIBILITY

a. **Confirmed Formerly Used Defense Site**

(1) Former land usage and ownership by the War Department/DOD was previously confirmed for the approximate 1600 acre site as summarized in section 4a of this report. The site was used by the U.S. Army, 115th Cavalry for combat training exercises.

(2) In 1945, all acreage and facilities were sold, and leases relinquished by the War Department. However, due to the accident in 1948 when the Swagerty boys were killed, the government ultimately repurchased 652 acres of land believed to be potentially contaminated. When this land was transferred back to public use, all deeds contained a

restriction to surface use only and hold harmless clause (see documents G-4 and G-5). This included 32 acres of land on the east side of the road that was later determined to be uncontaminated, and ultimately had the restrictions removed from the deeds (see document F-7). Today, no ownership remains with the DOD or any other federal agency.

b. Potential Formerly Used Defense Site

(1) In addition to the 32 acres (actually 27.87) on the east side of Deer Park Road purchased in 1958, which was not a part of the original 1600 acre site, other acreage has been determined to be associated with this site. This includes those areas that lie within the perceived firing fans that extend beyond the site boundary (Area F). This includes approximately 960 acres that exists as potential FUDS (see plate 5).

(2) Also, a misfiled "Realty Control File Summary" was located in the records for the Port Angeles Combat Range (see document G-6). This document cites the existence of the Port Angeles Army Air Field, 62 miles NW of Seattle. This unrelated site could also exist as a potential FUDS.

6. VISUAL SITE INSPECTION

a. General Procedures and Safety

(1) During the period of 25-29 July 1994, members of the Assessment Team, Ms. Mary Jo Civis and Ms. Karen Beachler, traveled to the former Port Angeles Combat Range near Port Angeles, WA. The primary task of the team was to assess OE presence and potential due to storage, disposal, and/or usage of the site as a training area. The site inspection was limited to non-intrusive methods; i.e. subsurface sampling was not authorized nor performed.

(2) Real estate rights-of-entry were not obtained by the team due to the willingness of the current owners to allow the team to visit their property. Owners were briefed on the non-intrusive nature of the inspection and the safety measures used by the inspection team.

(3) A site safety plan was developed and utilized by the assessment team to assure safety from injury during the site inspection of the area. Prior to the inspection, a

briefing was conducted which stressed that OE should only be handled by military EOD personnel (see reference B-3).

(4) Prior to the site visit, a thorough review of all available reports, historical documents, texts, and technical ordnance reference materials gathered during the historical records search was made to ensure awareness of potential ordnance types and associated hazards.

b. AREA A: Direct Fire Impact Area

(1) This area extends from the firing point down range to a distance of 1000 yards and includes the impact area for small arms, 37mm, 75mm and mortar fire. While a complete evaluation of the determination of this areas perimeters occurs in section 7, in short, it takes into account the documented "known distance range" of 200 to 300 yards and the interview information citing a distance of 500 yards to the target for direct fire of 37mm rounds. The area from 500 yards to 1000 yards is the approximate area of impact for target overshoots (see plates 5 & 6).

(2) Area A-1 is that portion of Area A that exists beyond the cleared area. This area is wooded and overgrown. The majority of the area is approximately 1000 feet above sea level with a canyon/Surveyor Creek running through it at approximately 750 feet above sea level. This land is basically owned and used by the City of Port Angeles as a water shed.

(3) Due to the wooded nature of this area and the lack of accessibility, the SI team only traversed a small portion of the area near the main road and around its northern boundary. No ordnance related items were observed, nor were any obvious signs of ordnance usage (see photo J-2 & plate 8).

(4) Area A-2 is that portion of Area A that exists as an open range/meadowland (also an extension of Area D). The entire area is basically level (1000 feet above sea level) with various grasses. A small strip of trees and brush appear in the middle of the area which merely camouflages a small creek that passes through the site (Frog Creek). While the area was generally dry during the site visit, several grasses were observed that are indicative of wetlands (see photo J-3).

(5) This area contains the one documented location of .71 acres that was cleared several times and cited as heavily contaminated (see plate 5). This location is perceived as the location of at least one of the direct fire targets. Observation of this approximate location did not indicate any signs of OE nor even shrapnel from live fire or the noted tank targets.

(6) Within this area the SI team also observed a few fruit trees believed to be part of the orchard referred to by several interviewees (see photo J-4 & plate 7). This was cited as the general direction of fire.

(7) Generally, the terrain in this area was level and grass covered, yet seemed a bit "bumpy". This may, or may not have been a result of bombardment during its use as a range. However, the team did note the existence of what took on the appearance of gopher or rodent entry holes. There were quite a few of these and they varied a little in size and were covered with grass. Because the directional entry of the holes seemed to be somewhat at an angle from north to south, it was considered that they could have been entry holes for medium caliber ammunition, i.e., 37mm or 75mm. Because no intrusive sampling could be done, the team used the magnetometer over several of these holes. Approximately six of the ten holes monitored showed a magnetic signature (see photos J-5 & J-6).

(8) During the walk throughout the area, no OE or metal fragments of any kind were observed. The few trees on the perimeter of the area that were observed did not clearly show signs of scarring from metal fragments or bullets, taking into consideration however, that some appeared to be second growth.

c. AREA B: Indirect Fire Impact Area

(1) This Area Encompasses that portion of land determined to be the likely impact area for 37mm, mortars, and 75mm ammunition. Because no clearly defined target areas are documented, this area was calculated taking into account interview information, the 1939 aerial photograph, knowledge/use of training practices, and use of firing tables. Again, as with area A, a more thorough evaluation of the determined perimeter is discussed in Section 7.

(2) This area consists of approximately 370 acres, all of which is heavily wooded, and only remotely accessible by a few jeep trails. The majority of this area could not be traversed by the SI team. The only portion of this area actually observed was the area near the east where Deer Park road passes through. There were no signs of OE noted by the SI team (see photo J-7 & plate 8).

d. AREA C: Buffer Zone

(1) This area includes the area around the impact area where fragmentation may be expected from blasts occurring on the outer edges of the impact area. It also acts as a safety margin for that small portion of rounds that may have been off target more than what is statistically anticipated (see Section 7 for additional evaluation/determination of area).

(2) This area too has been broken into two sub-sites, C-1 and C-2. Area C-1 is that portion of the buffer zone that lies within the project site boundaries (noting that portions of the buffer zone extend beyond the 1600 acre site). It is heavily wooded and very limited in terms of access, as can be noted on the topographical map and plate 6. It also represents a rise in elevation to 3541 feet above sea level at the peak of Round Mountain, noting the exception of the canyon/creek that cuts through the area. Because of this terrain and limited access, only a very small amount of this area was actually traversed/observed by the SI team. No signs of OE/debris were noted. However, warning signs were observed near the perimeter of this area not far from Deer Park Road (see photo J-8 & plate 8).

(3) Area C-2 is that portion of Area C that overlaps with Area D and is level meadowland. While there appeared to be some undulation of the ground in this area as noted in Area A-2, the team did not see any signs of OE or OE debris (see photo J-4 & plate 8).

d. AREA D: Combat Training Area

(1) This area is that part of the site that includes the majority of open meadowlands (and the edge of the wooded area) that do not lie within any part of the

firing fans. Based on documented and interview information noting practice land mines, foxholes, and troops crawling under barbed wire fences, it is speculated that some type of infiltration course/combat training occurred in the open meadow of this site (also pertinent to Areas A-2 and C-2). Its northern limit does not include the two small fields within the very northern part of the project site because of several references stating that the Little property was not used (see plates 5 & 6).

(2) Just beyond the tree line to the west is the canyon/Surveyor Creek (see photo J-9) with Deer Park road making up the eastern boundary (see photo J-10). Along this road is a barbed wire fence with an inconspicuous loose rail/section that can be moved allowing entry to the field (see photo J-11). It should be noted that this point of entry would not have been found by the SI team without the aid of the city engineer that escorted the team to the site.

(3) The team noted a warning sign along the road just north of this entry point (see photo J-12). However, the inspection of the area showed no signs of OE, foxholes, the firing point, nor of any indication of burial pits that could have been utilized for any unwanted ammunition (see photo J-13 & plate 8).

f. AREA E: All Remaining Land

(1) This area includes all those portions of land that lie within the original 1600 acre site boundary that have been determined not to be portions of land used or affected by ordnance. It includes the 32 (27.87) acres not a part of the original site, but purchased in 1958 as a part of the area suspected of OE contamination, as well as a small portion of the site that lies within the Olympic National Park (see plates 3, 4 & 5).

(2) The northeast portion of this area was wooded and generally overgrown, but allowed some accessibility for inspection. The existence of an old moss covered foundation was noted on the Diehl property (see photo J-14). And one ranch house was noted in the area of the southeast corner of Section 4 (see plate 4). No sign of OE nor ordnance related usage was observed.

(3) The portion of this area to the north-northwest was predominantly steep terrain (canyon) with dense forests (see photo J-9 and plate 8). These portions of Area E were not traversed by the SI team (see plate 7).

g. AREA F: Impact/Buffer Area (additional acreage)

(1) This area consists of all acreage not included in the FDE/site boundary that has been determined to lie within the designated firing fan for the site as explained for areas A, B and C (see plate 5). Its terrain is consistent with that of Area C-1 (see photo J-8 & plate 8) and includes some privately owned land along with additional portions of Olympic National Park.

(2) As with area C, only a small portion of this area on the east was actually traversed by the inspection team. No OE nor signs of ordnance usage was noted.

7. EVALUATION OF ORDNANCE HAZARDS

a. General Procedures

(1) Each subsite was evaluated to determine confirmed, potential, or uncontaminated ordnance presence. Confirmed ordnance contamination is based on verifiable historical evidence or direct witness of ordnance items. Verifiable historical record evidence consists of ordnance items located on site since site closure and documented by local bomb squads, military Explosive Ordnance Demolition (EOD) Teams, newspaper articles, correspondence, and current findings. Direct witness of ordnance items consists of the site inspection team directly locating ordnance items by visual inspection. Additional field data is not needed to identify a confirmed site.

(2) Potential ordnance contamination is based on a lack of confirmed ordnance presence. Potential ordnance contamination is inferred from records or indirect witness. Inference from historical records would include common practice in production, storage, or disposal at that time, which could have allowed present day ordnance contamination. Potential ordnance contamination could also be based on indirect witness or from present day site features. Additional field data is needed to confirm potential ordnance subsites.

(3) Uncontaminated ordnance subsites are based on a lack of confirmed or potential ordnance evidence. There is no reasonable evidence, either direct or inferred, to suggest present day ordnance contamination. Additional field data is not needed to assess uncontaminated ordnance subsites.

(4) Generally, the final evaluation of this site required the determination of the firing point and development of a firing fan. All information obtained from historical documentation, interviews, training regulations/policies, and technical knowledge of ordnance usage and training was utilized to develop this fan. The limited historical documentation on the proposed site layout (see document F-2), while determined to be a good **basic proposal**, was not followed precisely for the following reasons:

(a) When used in conjunction with the 1939 aerial photo, it placed the precise location of the firing line too far south in the field to allow for the 500 yards to the target cited for direct fire of 37mm rounds (see document I-17). This would have placed the target in the wooded area. And while this interview information can not be taken as absolute (as the interviewee noted he was not sure), this distance would be feasible for direct fire of 37mm (or 75mm) rounds. Therefore, to ensure full coverage of the potential hazard area, the firing line was placed further north at the edge of the clearing (see plate 7).

(b) When the .71 acre area documented as heavily contaminated and sweep twice, is placed in relation to this firing fan, the area falls just in front of the supposed impact area. Because an impact area must take into account rounds falling short of the target (which this fan placement did not), it seemed a logical possibility that the firing point could have been further north than originally planned. This would account for said .71 acre area to be the approximate location of at least one direct fire target (see plate 6).

(c) The citing of an exact direction of fire in document F-2 is constant with a known distance target range. However, because it was confirmed to have been used for indirect fire of 37mm and 75mm rounds using a coordinate system, there could not have been one absolute direction of fire, else the soldiers could not have trained effectively.

(5) In general the firing fan can be simply calculated using firing tables and training manuals given target placement and ordnance fired. Unfortunately, due to the nature of indirect firing and the lack of documented target areas, not to mention some disparity in actual placement of the direct fire targets, the following information and assumptions were used prior to the formal calculation of the firing fans:

(a) There were numerous statements noting the direction of fire as southwest and toward the mountains, with comments noting firing "in the direction of the old barn" and "toward the orchard", and the statement that once the troops fired too far left and hit an old barn.

(b) The fact that one person that actually trained at the site thought they utilized coordinates at about 1500 yards for indirect firing utilizing forward observers. Keeping this in mind and observing the 1939 aerial photograph of the site with the overlaid topographical map (see plate 7), a somewhat open, level area exists between 1000 and 2000 yards from the firing point. As you go beyond the 2000 yard point, the terrain of the site begins to increase from 1000 feet above sea level to 1250 feet, to 1500 feet. This would have served well for a forward observer to locate at a higher point to observe/score the hits (see plates 6 & 7).

(c) Finally, the documented location of the Swagerty accident was also considered.

(6) Once the target areas were theorized, the right and left perimeters were set. The "worst case" left line was placed just inside the old barn, taking into account that it was an unusually "off target shot" that caused the barn to receive a hit. The right line found the terrain potentially open for indirect fire to be the worst case, which fell in line with the edge of the old orchard. To this intended impact area a probable error (PE) was added to each side (IAW appropriate firing tables) to determine the actual impact area (see references B-11, B-12, B-13 & plate 6). The right and left limits of the buffer zone were then determined using the standard rule of a 25 degree angle of deflection, taken to the point of the target (500 yds), then continued parallel along the line of the impact area (see document D-3).

(7) The down range buffer zone was **NOT** calculated utilizing the firing tables and standard procedures. The reason being, there is some question as to the fact that 1500 yards was the only distance utilized for indirect firing. While the person interviewed seemed very astute, when asked about the distance of indirect fire, he admitted he wasn't really sure. Because the maximum range of a 75mm round exceeds 13,000 yards, it seems somewhat likely that firing at greater distances took place, noting that observation of the blast (scoring the hit) on a distant hill side was a typical scenario in training. Therefore, for the purpose of this report, the down range buffer zone was utilized as a means of taking this possibility into account. Its limit was determined by the peak of Round Mountain (see photo J-4) noting that coordinates/hits on the unseen side of the mountain would not have been utilized.

b. AREA A: Direct Fire Impact Area

(1) This area begins at the firing point and extends to a range of 1000 yards. It is considered a **confirmed** area of OE contamination simply due to the documented accident of the Swagerty boys 4 years after the site was returned to public use. While the actual accident occurred within area A-2, the tree in which the round was embedded was most likely downed in area A-1 (see plate 5). Additionally, statements from local residents noting metal scrape and bullets in trees south/west of the open field further aids in the confirmation of OE contamination in area A-1.

(2) It has been verified that the 115th Cavalry trained in this area using direct fire of small arms (.30, .45, and .50 cal.) and 37mm ammunition. This has been confirmed through interviews and is consistent with the unit TO&E (see document D-1). And while former Cavalry members stated they only trained with 37mm TP and AP rounds and did not do direct firing of 75mm rounds at the site, a documented EOD report cites the recovery of an M63, 37mm (HE) round and M51 (probably M48) fuze bodies which are used on 75mm rounds.

(3) The existence/use of mortars in this area is unfortunately, not as easy to verify. The only reference in all the documentation obtained on this site is that fragments from 81mm mortar fins were recovered during a

clearance. While possible, it is questionable whether the Cavalry Reconnaissance Group ever used 81mm there, as the TO&E indicates that only a total of 3 were issued to the whole Armored Division (see documents D-1 and F-8). And while a 60mm mortar is more easily justified for a Cavalry unit (noting 36 on the TO&E), those individuals interviewed from the 115th stated that they didn't even have mortars. Consequently, it is theorized that other troops in the area, i.e., infantry, may have also used this site. At any rate, the fact that it was only fragments that were found indicates use of HE (or WP).

(4) No documentation on the infantry units then stationed in the area (41st Infantry Division) or out at Fort Lewis (30th Infantry Division) revealed training at this site. None the less, local residents cited troops crawling under barbed wire, utilizing fox holes, and finding practice land mines, all of which would be consistent with infiltration courses set up for training infantry units (see document D-3). And while this may also be expected of a Cavalry unit, all persons from the 115th that were interviewed stated they did not do this type of activity at the Port Angeles Range.

(5) In light of the unconfirmed speculation of training of infantry troops at this site, it seems prudent to suspect that 2.36" rockets may have also been used at this site. While there is no documentation to support this, this item is used by a cavalry reconnaissance unit and also an infantry unit. Additionally, M9 rifle grenades are also speculated, as this too was a very common training item for the infantry, and also because this site would have lended itself well to training with both of these items. (NOTE: Numerous other items could be considered, but speculation is being limited to those that are most probable.)

(6) This area is subdivided into areas A-1 and A-2, which represents the variation of wooded area (A-1) and meadowland (A-2). While all of the ordnance addressed above could be expected in area A-2 or at its wooded boarder, practice land mines would not be expected to exist in area A-1, except in the rare case where one may have been tossed or carried deep into the woods. Further, based on the site inspection, any OE contamination still remaining in area A-2 would be sub-surface. On the other hand, in area A-1 it is most likely to be embedded in trees, but could also exist on

the surface or at sub-surface levels, as the terrain and/or ground cover would have precluded any possibility of a through search when it was cleared (see plates 5 & 7).

c AREA B: Indirect Fire Impact Area

(1) Based on interview information, the indirect firing of 75mm and 37mm rounds has been verified for this area. However, there was no information that could precisely place OE or ordnance debris within this area since site closure. The only document/clearance that actually cites specific ordnance recovered was done within area A-2 (see document F-6). While interview information cited the presence of small arms (which is not considered OE) and scrap metal in the trees, they were very vague in terms of where in the woods this was observed. Therefore, because no OE or scrap of any type was observed in this area during the SI, this area is considered **potentially** contaminated.

(2) Despite the delineation of this area as potential, it is almost certain that OE exists in this area. The 1956 clearance cited earlier noted finding the remains of four rusted M51 type fuze bodies, all expended. These were most likely actually M48 fuzes used for 75mm HE rounds. The two fuze bodies are identical, with the only difference being in the delay firing mechanism, which was probably not distinguishable after functioning. This would collaborate interview information specifically stating the indirect firing of 75mm HE and WP rounds.

(3) The question as to whether mortars would exist in this area is the same as stated for area A. Due to the fact that mortar fin fragments were found on site, it must be assumed that if, in fact, mortars were used at this site, it is likely they too could exist in this area.

(4) As for the rockets cited as potential in area A, they would not be expected to be in area B because their maximum range is considered to be 700 yards.

d. AREA C: Buffer Zone

(1) As previously explained, this area is an extension of areas A and B. While it is intended as a hazard area where shrapnel from impending blasts at the outer limits of the impact area may occur, it also functions

as an area where rounds that were fired with greater error than statistically expected, may exist. Further, this report cites its down range portion as a logical expansion of the indirect fire impact area (area B). Therefore, while no OE or ordnance debris has been confirmed for this area, it must be considered **potentially** contaminated.

(2) All ordnance previously stated as occurring in areas A-1 and B could potentially occur in area C-1 embedded in trees or at surface or sub-surface levels, noting that the existence of mortars becomes less likely/impossible as you progress further down range, due to their limited maximum range. Area C-2 however, would be expected to have that ordnance consistent with area A-2 (and area D) at subsurface levels, which includes practice land mines.

e. AREA D: Combat Training Area

(1) The actual use of this area is not easily verified. Based on the interview information of local residents citing crawling under barbed wire and noting use of fox holes, it has been determined that some sort of ground training did occur within the open field at this site (which encompasses areas A-2 and C-2 as well). This fact is supported by documented interviews after the Swagerty accident noting the finding of practice land mines. However, because all references to the finding of mines state where they were placed or thrown after discovery, rather than where they were found, this area can only be considered **potentially** contaminated.

(2) Because the reference to these mines is merely "land mines", it is not know if they were anti-personnel or anti-tank. Considering the lay of the land and the interview information, it has been determined that a close combat type course would have been likely (see document D-3). This would account for the fox holes/trenches and the barbed wire. This would then lead to the interpretation that anti-personnel practice land mines were being employed, most probably the M8.

(3) As the M8 practice mines are reusable, it is somewhat likely that the practice mines recovered were simply inert bodies. This is due to the fact that all the explosive components are issued separately and placed in the mine body prior to use. After the mine body has been used

so many times it is simply discarded. Placing the explosive components in it before discarding is not likely, though not inconceivable. However, due to the small size of the igniter assembly, spotting charge and propelling charge, the possibility of unused items being left behind, intentionally or accidentally, does exist.

(4) If the infantry was there training, it is also logical to expect that they not only utilized infiltration courses, but additionally, would have practiced laying mine fields. Therefore, the existence of practice anti-tank mines accidentally left where they were placed, sub-surface, must also be considered.

(5) No signs of burial were noted by the SI team, nor was any surface OE. Therefore, based on the fact that the area has been used for grazing with no reports of surface contamination, any OE that may exist would be at sub-surface levels.

f. AREA E: All Remaining Land

(1) This area consists of all acreage within the site determined to lie outside of any ordnance related activities. This includes the 32 (27.86) acres purchased in 1958 that was actually not a part of the original site purchased in 1943. All this land has been determined to be **uncontaminated** (see plate 5).

(2) The inclusion of the above mentioned 32 acres is an important issue. This is due to the fact that this area was cited as part of the area within the "probable limits of contamination" that was consequently repurchased by the government in 1958. However, a very concentrated effort by the SI team to validate this information found quite the contrary.

(3) All persons interviewed that had first hand knowledge of site usage said they did not fire across the road. Locals in the area specifically stated that they went into the open field and fired south/southwest, all of which is consistent with the proposed firing fan and actual site acreage purchased (see plate 2). Also, one property owner in this area that has done some excavating on his property reported finding nothing that was ordnance related.

(4) The final convincing fact is that of the 1952 clearance of 10 acres in the SW ¼ of the SW ¼ of Section 4 (see plate 3). At the time, it was believed that this land had been missed during the previous clearance so the land owner requested it be done. The clearance report on this area stated clearly that the area must have already been cleared because **NO SIGNS** of OE or even scrap were found. It has been determined that the real reason nothing was found here may well have been because there never was contamination in this area to begin with. This is especially true when you consider that the other clearances done over the same areas, i.e., .71 acres, showed continual recovery of OE and scrap.

(5) As for the "Little property" (now owned by the Barons) cited for possible contamination, historical documented interviews are consistent with information obtained from local residents; that the property was only purchased as a means of entry into the site and all the firing was south of the property.

(6) As for the remaining portions of area E, there is no evidence to support even the possibility of OE contamination.

g. AREA F: Impact/Buffer Area (Additional Acreage)

This area is predominately that portion of area C-1 that extends beyond the site boundaries addressed in the INPR/FDE. It's evaluation is identical to that of area C-1; it is considered a **potentially** contaminated area. All ordnance discussed as used or potentially used at this range could exist in this area, with the exception of the practice land mines. But, as distance increases from the firing point, rifle grenades, 2.36" rockets, and finally mortars no longer become a consideration.

8. SITE ORDNANCE TECHNICAL DATA

a. End Item Technical Data

Table 8-1 has been developed to establish a list of potential ordnance items and their explosive/chemical fillers that could exist at surface or sub-surface levels within the former site. The items in this table include those items actually listed on historical documents and

those items reasonably expected to exist based on the usage scenario accompanying the site. In most cases, model numbers used are speculative, and consistent with the ordnance typical of the time frame. Drawings/data can be found for all items listed in Appendix D.

TABLE 8-1
AMMUNITION USED AND EXPLOSIVE/CHEMICAL FILLER

ITEM	MODEL/TYPE	FILLER/WEIGHT	FUZE
Ctg, .30 Caliber	M2/Ball	Lead Antimony	-
	M2/AP	Tungsten Chrome Steel	
	M1 Carbine	Lead	
Ctg, .45 Caliber	M1911/Ball	Lead Antimony	
	w/ M1 Tracer	Tracer Composition	
Ctg, .50 Caliber	M2/Ball	Soft Steel	-
	M2/AP	Tungsten Chrome Steel	
	w/ M1 Tracer	Tracer Composition	
Shell, 37mm	M63/HE	.085# Flaked TNT	BD
	w/ Fuze M58	Lead Azide	
		Tetryl	
	w/ Primer M23	20 gr Black Powder	
		Primer Mixture	
	w/ Propellant	.44# FNH Powder	
	M74/AP	1.92# Solid Steel	
	w/ Tracer	Tracer Composition	
		Igniting Composition	
	w/ Primer M23	SAB	
Mortar, 60mm	w/ Propellant	8.1oz FNH Powder	PD
	M51/TP	Steel & Aluminum Alloy	
	w/ Primer M23	SAB	
	w/ Propellant	6.6oz FNH Powder	
	M49/H.E.	.34# TNT	
	w/ Primer M32	.37 gr Primer Mix	
		24.8 gm Black Powder	
		Pellet	
	w/ Propellant	140 gr DB Powder	
	w/ Ignition Ctg	40 gr DB Powder	
	w/ Fuze M52	Mercury Fulminate &	
		Lead Azide Detonator	
		Tetryl Booster	

TABLE 8-1
AMMUNITION USED AND EXPLOSIVE/CHEMICAL FILLER

ITEM	MODEL/TYPE	FILLER/WEIGHT	FUZE
Mortar, 60mm	M50/Practice	.05# Black Powder	PD
Shell, 75mm	M48/H.E.	1.47# TNT	
	w/ Propellant	.92# FNH Powder	
	w/ Fuze M48 or M54		SQ/PD Comb-Time SQ/PD
	M64/WP	1.35# White Phosphorus .92# FNH Powder	
Mortar, 81mm	M61 A.P. (practice)	Steel 2# FNH Powder	
	w/ Tracer	Tracer Composition	
	M43A1/H.E. Shell	1.22# TNT	PD
	w/ Primer M33	0.37 gr Primer Mix 1.65 gr Black Powder Pellet	
	w/ Propellant	700 gr DB Powder	PD
	w/ Ignition Ctg	120 gr DB Powder	
	w/ Fuze M52	Tetryl Booster Mercury Fulminate Lead Azide	
	M44/Practice	Inert Fill .20# Spotting Charge	PD
	M57/WP Smoke	4.04# White Phosphorus 820 gr DB Powder	PD
	M9A1 AT (Rifle)	4 oz. 50/50 Pentolite 10/90 Pentolite Booster	
Mines, AP	M8/Practice w/ Fuze, M10A1	Empty Steel Body Black Powder Red Phosphorus Chg	
Mines, AT	M1/Practice w/ Fuze, M1, Practice	Inert Black powder and Red Phosphorus Chg	

TABLE 8-1 AMMUNITION USED AND EXPLOSIVE/CHEMICAL FILLER			
ITEM	MODEL/TYPE	FILLER/WEIGHT	FUZE
Rocket, 2,36" (Bazooka)	M7/Practice	Steel Warhead Black Powder Squib DB Propellant Sticks	
	M6/HEAT w/ Propellant	.5# 50/50 Pentolite M7 Powder	BD

b. Chemical Data of Ordnance Fillers

Table 8-2 below defines the chemical compounds of the explosive materials listed in Table 8-1.

TABLE 8-2 CHEMICAL DATA OF ORDNANCE FILLERS		
Explosive Material	Synonyms	Chemical Compounds
TNT	2,4,6-trinitrotoluene	$C_7H_5(NO_2)_3$
Tetryl	Trinitrophenyl-methyl-nitramine	$C_7H_5N_5O_8$
Mercury Fulminate	Mercuric Cyanate	$Hg(CNO)_2$
Black Powder		
74% Potassium Nitrate	Salt Peter; Niter	KNO_3
11% Sulfur	-	S
16% Charcoal	-	C
Nitroglycerin	Glyceryl Trinitrate; Dynamite	$C_3H_5N_3O_9$
Lead Azide	TBD	$Pb(N_3)_2$

TABLE 8-2
CHEMICAL DATA OF ORDNANCE FILLERS

Explosive Material	Synonyms	Chemical Compounds
Pentolite		
Various %		
TNT	SAB	SAB
PETN	Pentaerythritol Tetranitrate; 2,2-bis[(Nitrooxy) Methyl]; 1,3-Propanediol; Pentrite; Nitro- penta; TEN	$C_5H_8O_4(NO_2)_4$
Double Base (DB) Powder	Ballistite	
60% Nitrocellulose	Guncotton	$[C_6H_8O_5(NO_2)_3]_n$
39% Nitroglycerin		$CH_2NO_3CHNO_3CH_2NO_3$
.75% Diphenylamine	Stabilizer; DPA	$(C_6H_5)_2NH$
FNH Powder	Smokeless Powder	
Nitrocellulose	SAB	SAB
Dibutylphthalate	Gelling Agent	$C_6H_4(CO_2C_4H_9)_2$
Dinitrotoluene	DNT	SAB
Diphenylamine	SAB	SAB
Primer Mix		
Mercury Fulminate		SAB
Potassium Chlorate		$KClO_3$
Antimony Sulfide		Sb_2S_3
Red Phosphorus		P
White Phosphorus	WP	P
Tracer Composition		
Various Combinations		
Strontium Nitrate		$Sr(NO_3)_2$
Polyvinyl Chloride		-
Strontium Peroxide		SrO_2
Magnesium Powder		Mg

9. OTHER ENVIRONMENTAL HAZARDS

a. **Hazardous, Toxic, and Radiological Waste**

No records located during the record search nor observations made during the site visit indicate possible HTRW contamination within this site.

b. **Building Demolition/Debris Removal**

No observations were made indicating any potential BD/DR projects.

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APPENDIX A

REFERENCE SOURCES

Reference Sources

Organizations	Name	Telephone	Nature of Support
GOVERNMENT SOURCES			
FEDERAL AGENCIES			
Department of Defense			
Defense Mapping Agency ATTN: PMSC 6001 MacArthur Boulevard Bethesda, MD 20816	James Ferguson	301-227-2495	No Information
Defense Technical Information Center (DTIC) Cameron Station Alexandria, VA 22304-6154	Computer Search	202-274-7633	No Information
Defense Library On Disk (DLOD) Pentagon Library, Room 1A518 Washington, DC 20301-6000	Computer Search	703-697-4658	No Information
Defense Logistics Studies Information Exchange (DLSIE) Fort Lee, VA 23801-6043	Computer Search	804-734-4007	No Information
Army			
U.S. Army Military History Institute Carlisle Barracks Building 22 Carlisle, PA 17013	Dennis Vetock John Slonaker	717-245-3611	Background Info., AR 775-10
Center Of Military History Attn: DAMH-RAS 1099 14th Street NW Washington, DC 20536	Gerry Harcarik	202-504-5416	General Information

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Organizations	Name	Telephone	Nature of Support
GOVERNMENT SOURCES			
FEDERAL AGENCIES (continued)			
Department of Defense (continued)			
Army (continued)			
Rock Island Arsenal Museum ATTN: SIORI-PCA-M Bldg 60 Rock Island, IL 61299	Herb Lafore	309-782-1272	Ordnance Manuals
IOC Historical Office ATTN: AMSIO-EAH Bldg 390 Rock Island, IL 61299-5000	Tom Slattery	309-794-1450	No Information
U.S. Army Construction Engineering Research Lab (CERL) Champaign, IL 81820	Pat Lacey	217-373-7217	No Information
USACE-Office Of History Humphreys Engineer Center 7701 Telegraph Road Alexandria, VA 22310	Dr. James Dunn	703-355-3558	No Information
USACE, HQ ATTN: CEMP-RT 20 Massachuettas Ave, NW Washington, DC 20314-1000	Jim Ballif	202-272-8880	Referral for Tech Report
USACE, Seattle District ATTN: CENPS-EN-GT-HW P.O. Box 3755 Seattle, WA 98124-2255	Jonathan Maas, Environmental Engineer	206-764-6745	Historical Documents and Site Drawings
U.S. Army Chemical School Fisher Library Building 1081 Fort McClellan, AL 36205-5000	Richard Pastorett	205-848-4414	No Information

Reference Sources

Organizations	Name	Telephone	Nature of Support
GOVERNMENT SOURCES			
FEDERAL AGENCIES (continued)			
Department of Defense (continued)			
Army (continued)			
U.S. Army Ordnance Museum ATSL-DOS-M Building 2601 Aberdeen Proving Ground, MD 21005	Dr. Atwater	410-278-3602	No Information
U.S. Army I Corps, Ft. Lewis ATTN: AFZH-DPT-OH Ft. Lewis, WA 98433	Joe Huddleston	360-967-7800	No Information
Ft Lewis Military Museum Main St., Bldg T4320 Ft. Lewis, WA 98433	Greg Hagge, Curator	360-967-7206	Info on 115th Cavalry
Ft Lewis Library Bldg 2109 Ft Lewis, WA 98433	Debra	360-967-7736	Referrals
Army Safety Management Information System (ASMIS) Fort Rucker, AL 36322	Computer Search	205-255-6485	No Information
548th Ordnance Det (EOD) Ft Lewis, WA 98433	SGM Harrison	360-967-1971	No reports of OE finds w/i site
Navy			
Navy EOD OIC EODMU, 9th Det Bremerton, WA	Sr. Chief Wagner	360-396-4576	No reports of OE finds w/i site
NAVEOD Tech Division CODE 6011E Indianhead, MD 20641	Kurt Gustafson	301-743-6890	Lead on Range Clearance Assessment Report

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Organizations	Name	Telephone	Nature of Support
GOVERNMENT SOURCES			
FEDERAL AGENCIES (continued)			
National Archives and Record Administration			
NARA-Archives II (Textual Reference Branch) 8601 Adelphi Road College Park, MD 20740	Staff	301-713-7250	No Information
NARA-Archives I (Modern Military) Pennsylvania Ave and 7th Street Washington, DC 20408	Staff	202-501-5385	Documents
NARA-Archives II (Civil Reference Branch) 8601 Adelphi Road College Park, MD 20740	Staff	301-713-7250	Documents
NARA-Suitland Branch (Civil and Military) 4205 Suitland Road Suitland, MD 20409	Staff	301-457-7190	No Information
NARA-Archives II (Still Picture Branch) 8601 Adelphi Road College Park, MD 20740	Staff	301-713-6660	No Information
National Personnel Records Center 9700 Page Avenue St. Louis, MO 63132	Bill Seibert Wilson Sullivan	314-538-4085	No Information
NARA-Pacific Northwest Region 6125 Sand Point Way NE Seattle, WA 98115	Sue Karren	206-526-6507	Documents

Reference Sources

Organizations	Name	Telephone	Nature of Support
GOVERNMENT SOURCES			
FEDERAL AGENCIES (continued)			
National Archives and Record Administration (continued)			
NARA-Achieves II (Cartographic and Architectural Branch) 8601 Adelphi Rd College Park, MD 20740	Staff	301-713-7040	No Information
NARA-Archives I (Old Military) Pennsylvania Ave and 7th Street Washington, DC 20408	Staff	202-501-5385	No Information
NARA-Archives I (Navy) Pennsylvania Ave and 7th Street Washington, DC 20408	Staff	202-501-5385	No Information
Department of the Interior			
USGS-Earth Science Information Center 1400 Independence Road Rollo, MO 65401	Staff	307-358-3644	No Information
USGS-Earth Science Information Center 507 National Center Reston, VA 22092	Staff	703-860-6045	No Information
USGS-Distribution Denver Federal Center Denver, CO 80225	Staff	303-263-4700	No Information
National Park Service 3002 Mt. Angeles Road Port Angeles, WA 98362-6798	Jane Hendricks, Paul Gleeson, Cultural Resource Mgr	360-452-4510 -0316	Interview (I-9)

Reference Sources

Organizations	Name	Telephone	Nature of Support
GOVERNMENT SOURCES			
FEDERAL AGENCIES (continued)			
Department of Agriculture			
Consolidated Farm Service Agency/ Natural Resource Conservation Service 111 E. 3rd, Rm 2B Port Angeles, WA 98362	Kerry Perkins	360-457-5091	Soil Survey
Library of Congress			
Library Of Congress Geography And Map Division Washington, DC 20536	Staff	202-707-5522	No Information
Smithsonian Institute			
National Museum of American History 14th Street and Constitution Ave Washington, DC 20536	Tom Crouch	202-357-2515	No Information
STATE AGENCIES			
Washington State Historical Society Henry Hewitt Research Library 315 Stadium Way Tacoma, WA 98403	Maybel Bailey	360-593-2830	Referrals
Washington State Police 4811 Werner Road Bremerton, WA 98312	Monte Simpson	360-452-3394	No reports of OE findings at site on record.
Washington State Museum 211 West 21st Ave. Olympia, WA 98501	Nicole	360-753-2580	Referrals

Reference Sources

Organizations	Name	Telephone	Nature of Support
GOVERNMENT SOURCES			
COUNTY AGENCIES			
Clallam County Extension Office Lincoln St Port Angeles, WA 98362	Jack Wad Grant Beck, Archeologist	360-417-2279	Interview (I-8)
Sheriff's Department 223 East 4th St. Port Angeles, WA 98362	Judy	360-417-2257	No reports of OE findings at site on record.
Clallam County Assessor's Office 223 East 4th St. Port Angeles, WA 98362	Kathy Parish Mel Sund, Forester	360-417-2400	Plat Maps Interview (I-1)
Clallam County Public Works 223 East 4th St. Port Angeles, WA 98362	Donna Richman	360-417-2379	Referrals
King County Library System 300 Eighth Ave. North Seattle, WA 98109-5191	Robin	206-543-0242	No Information
CITY/LOCAL			
North Olympic Library System 2210 S. Peabody Port Angeles, WA 98362-6598	Charlotte Patterson	360-457-4464	No Information
Port Angeles Branch Library 207 S. Lincoln Port Angeles, WA 98362	Peggy	360-452-9253	No Information
Tacoma Public Library 1102 Tacoma Ave. South Tacoma, WA 98402-2098	Gary Reese	206-591-5666	General Information
Seattle Public Library 1000 4th Ave. Seattle, WA 98104	Sharon	206-386-4100	Newspaper Article

Reference Sources

Organizations	Name	Telephone	Nature of Support
GOVERNMENT SOURCES			
CITY/LOCAL (continued)			
Port Angeles Police Department 321 E. 5th St. Port Angeles, WA 98362	John Rife	360-452-4545	No reports of OE Finds at site on record.
City of Port Angeles 321 E. 5th St. Port Angeles, WA 98362	Ken Rideout, Dir. of Public Works Ron Johnson, City Engineer	360-457-0411	General Information, Interview (I-2), Site escort
NON-GOVERNMENT SOURCES			
NATIONAL AGENCIES			
Scientific and Technical Information Library System 689 Discovery Drive Huntsville, AL 35806	Computer Search	205-922-9820	Range Clearance Assessment (B-4)
Online Computer Library Center 6565 Frantz Rd Dublin, OH 43017-3395	Computer Search	800-848-5878	No Information
DIALOG Information Service, Inc. Midwest Regional Office 75 E. Wacker Dr. Chicago, IL 60601	Computer Search	312-726-9206	No Information
CITY/LOCAL			
Peninsula Daily News 305 W. 1st St. P.O. Box 1330 Port Angeles, WA 98362	Marci	360-452-2345	No Information
Office of Archeology & Historical Preservation 111 W. 21st Ave., KL-11 Olympia, WA 98504	Lauren	360-753-4011	Referrals & General Information

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Organizations	Name	Telephone	Nature of Support
NON-GOVERNMENT SOURCES			
INDIVIDUALS			
Edward Schreiner 1264 S. Deer Park Rd. Port Angeles, WA 98362	Landowner	360-452-4943	Interview (I-4)
Raymond Diehl, Jr. 19178 11th Ave. NE Poulsbo, WA 98370	Landowner (& Marian Hanson)	360-779-9229	Interview (I-3)
Mrs. Mickey Baron 113 Libby St. Sequim, WA	Local Resident	360-683-2063	Interview (I-5)
Ron Baron	Local Resident (son of Mickey Baron)	360-452-7218	Phone Interview (I-11)
Florence Bailey Deer Park Rd. Port Angeles, WA 98362	Lifelong Resident (& Donald Barker)	Unpublished	Interview (I-6)
Violet (Winters) Grall Emery Rd. Port Angeles, WA 98362	Lifelong Resident	360-452-2706	Referred to brother.
Harold Winters Port Angeles, WA 98362	Lifelong Resident	360-452-2741	Interview (I-7)
Jake Benshoof P.O. Box 83181 Portland, OR 97283-0181	Former member of 115th Cavalry	503-286-3453	Interview (I-10) Documents, Referrals
Lewis Tucker 80 John Jacobs Road Port Angeles, WA 98362	Lifelong Resident	360-452-2685	Interview (I-12)

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Organizations	Name	Telephone	Nature of Support
NON-GOVERNMENT SOURCES			
INDIVIDUALS (continued)			
Thomas Tinkham 1091 Mt. Pleasant Rd Port Angeles, WA	Local Excavator	360-457-6270	Interview (I-13)
Emanuel Schmidt 2060 Buchanan St. Mt. Vernon, WA 98273	Former member of 115th Cavalry	360-856-1906	Interview (I-14)
Ray Hornby 8125 206 th St. SE Snohomish, WA 98290	Former member of 115th Cavalry	360-668-3290	Interview (I-15)
George Welch 170 Aster Casper, WY 82604	Former member of 115th Cavalry	307-235-4039	Interview (I-16)
Ronald Geisick 2518 E. D St. Torrington, WY	Former member of 115th Cavalry	307-532-5967	Interview (I-17)
Frank O'Neal Port Angeles, WA	Local Resident		Interview (I-18)
William Callahan 118 W. Emerson St. Hoquim, WA 98550	Former member of 115th Cavalry	206-533-2942	Interview (I-19)
Harriet Fish P.O. Box Carlsborg, WA 98324	Local Historian	206-452-9195	Referrals

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APPENDIX B
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APPENDIX B

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- B-2 U.S. Army Corps of Engineers, Seattle District, "Inventory Project Report (INPR) for Site Number F10WA003300, Port Angeles Combat Range, Clallam County, Washington", May 1993. (E-1)
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- "Includes Glacial History, Geology, Climatology, vegetation, and early settlement of the Olympic Peninsula in addition to the introduction and management of the mountain goat."
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- B-10 Department of the Army, TM 9-1300-214, Military Explosives, September 1984.
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- B-12 Department of the Army, FT 60-L-5, Firing Tables for Mortar, 60MM: M19 and M2..., March 1974.
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- B-16 War Department, TM 9-1900, Ammunition General, June 1945. (D-8)
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- B-18 Military Ordnance School, OS 9-20, Artillery Ammunition, July 1941. (D-5)
- B-19 Military Ordnance School, OS 9-20, Artillery Ammunition, Volume 1, November 1942. (D-5)
- B-20 Military Ordnance School, OS 9-20, Artillery Ammunition, Volume 2, February 1943. (D-5)
- B-21 War Department, TM 9-855, Targets, Target Materials, and Training Course Layouts, 17 August 1944. (D-3)
- B-22 Departments of the Army and Navy, AR 385-63, Policies and Procedures for Firing Ammunition for Training, Target Practice, and Combat, 15 November 1983. (D-3)
- B-23 War Department, TM 9-1904, Ammunition Inspection Guide, March 1944. (D-4, D-5, D-7, D-8)
- B-24 War Department, TM 9-1901, Artillery Ammunition, 29 June 1944. (D-6)
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APPENDIX C

GLOSSARY

APPENDIX C

GLOSSARY

AP	Anti-personnel or Armor Piercing
AR	Army Regulation
AT	Anti-tank
CG	Commanding General
CEHNC	Corps of Engineers Engineering and Support Center, Huntsville
CENCD	Corps of Engineers, North Central Division
CENCR	Corps of Engineers, Rock Island District
CENPD	Corps of Engineers, North Pacific Division
CENPS	Corps of Engineers, Seattle District
COE	Corps of Engineers
CON/HTRW	Containerized Hazardous, Toxic, and Radioactive Waste
DAC	Defense Ammunition Center
DB	Double Base
DERP	Defense Environmental Restoration Program
DOD	Department of Defense
EE/CA	Engineering Evaluation/Cost Analysis
EOD	Explosive Ordnance Disposal
FDE	Findings and Determination of Eligibility
FUDS	Formerly Used Defense Sites
GSA	General Services Administration
HE	High Explosive
HTRW	Hazardous, Toxic and Radiological Waste
INPR	Inventory Project Report
IRA	Interim Removal Action
mm	Millimeter
NARA	National Archives Records Administration
OE	Ordnance and Explosives
PE	Probable Error or Professional Engineer
QD	Quitclaim Deed
RA	Regular Army or Remedial Action
RG	Record Group
SAB	Same As Before
SUO	Surface Use Only
SIOAC-ES	Army Industrial Operations Ammunition Center Explosive Safety
USACE	U.S. Army Corps of Engineers
USADACS	U.S. Army Defense Ammunition Center and School
USAESCH	U.S. Army Engineering and Support Center, Huntsville
USATCES	U.S. Army Technical Center for Explosives Safety
UXO	Unexploded Ordnance
WAA	War Assets Administration
WD	War Department
WP	White Phosphorus
wpns	weapons

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APPENDIX D

TEXTS/MANUALS

APPENDIX D

TEXTS/MANUALS

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- D-9 Rockets, Drawings/Data (B-25, B-26)

The 1st Cavalry Division was activated 1 April 1941 at Fort Riley as a racially mixed formation; the 4th Brigade being Negro. It contained some of the oldest and proudest cavalry regiments of the Regular Army, but the lack of a requirement for horsed units led to its inactivation as a division on 15 July 1942 despite promising results in training maneuvers. The 4th Brigade remained active and formed the nucleus of the new 2nd Cavalry Division (Colored), reactivated 25 February 1943 at Fort Clark. The division arrived at Oran in North Africa during March of 1944 and was inactivated there on 10 May 1944. Its personnel were used to form service units in the theater.

Cavalry Brigades, Groups, and Squadrons

The cavalry mission of World War II was concentrated at squadron level, and all nondivisional mechanized cavalry regiments were broken up in late 1943 and early 1944 to form separate groups and squadrons. These were designed to perform reconnaissance missions employing infiltration tactics, fire, and maneuver, and engage in combat only to the extent necessary to accomplish their missions. Each cavalry group was composed of a Headquarters & Headquarters Troop and two or more attached mechanized cavalry reconnaissance squadrons. It was generally assigned to an army which attached it on a practically permanent basis to a specific corps, and the group was frequently further attached down to division level for operations. In addition to these separate mechanized cavalry reconnaissance squadrons in groups, each light armored division contained one (organized identically), each heavy armored division included a smaller armored reconnaissance battalion, and each infantry division had its own cavalry troop. In battle mechanized cavalry actually fought more often in an infantry mode.

Higher echelon cavalry brigades were intrinsic to the square concept of the cavalry division and brigade fates were tied to their divisions' survival. There were two exceptions. The separate 56th Cavalry Brigade from Texas, the only such National Guard unit inducted into federal service, operated over the two Texas National Guard regiments, the 112th and 124th Cavalry. However, after these were detached for overseas service, the brigade was no longer required and as a result it was redesignated as a separate cavalry reconnaissance troop which never left the States

CHART NO. 12

Cavalry Reconnaissance Squadron in World War II

CAVALRY RECONNAISSANCE SQUADRON	T/O 2-25	Officers	Warrant Officers	Enlisted Men	Armored Car, M8	75mm Howitzer on Carriage mot.	Light Tank	Halftrack, M3A1	Halftrack, Ambulance M3	Machinegun, .50-cal	Machinegun, .30-cal	81mm Mortar	60mm Mortar	Submachinegun, .45-cal	Carbine, .30-cal	Rifle, .30-cal	Pistol, .45-cal	Rocket Launcher, 2.36" Anti-Tank	Truck, 2 1/2-ton	Wrecker, Heavy	Weapons Carrier, 3/4-ton	Ambulance, 3/4-ton	Truck, 1/2-ton	Tank Recovery Vehicle, T5
Part of Armored Division	(15 Sep 43)	44	3	949	52	8	17	32	4	29	68	3	36	238	574	120	3	37	20	1	—	—	107	3
Part of Armored Division	(6 Jul 44)	44	3	861	52	8	17	32	4	29	68	3	36	235	536	120	3	37	20	1	1	1	110	3
Nondivisional	(15 Sep 43)	38	3	777	40	6	17	26	4	25	54	3	27	205	465	90	3	31	18	1	—	—	84	3
Nondivisional	(6 Jul 44)	38	3	702	40	6	17	26	4	25	54	3	27	202	434	90	3	31	18	1	1	1	87	3

consist of Troop E at McPherson, an element of the 69th Infantry Brigade.

CAMPAIGN STREAMERS

None

DECORATIONS

None

COAT OF ARMS

SHIELD: Per bend embattled azure and or, in chief a sheaf of wheat of the like and in base a mullet of eight points, pierced sable.

CREST: That for the regiments and separate battalions of the Kansas Army National Guard: On a wreath of the colors (or and azure), a sunflower, slipped proper.

MOTTO: The Prairie Sentinels.

Yellow is the color traditionally associated with Cavalry. The blue has been adapted from the Kansas State flag. The spur rowel refers to the unit's designation and reflects the multifaceted mission and capabilities of Cavalry. The sheaf of wheat on the blue background alludes to the unit's home location in Kansas, often called the "bread basket of the United States." The embattled division of the shield symbolizes defense and the purpose of a National Guard unit.

DISTINCTIVE INSIGNIA

The insignia is the shield and motto of the coat of arms.

FROM I CORPS
+ FT LEWIS

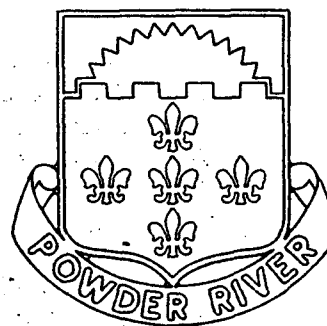
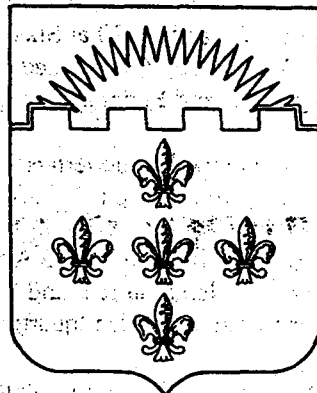
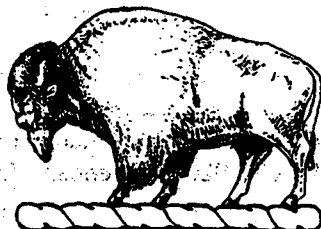
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115th ARMORED CAVALRY



Constituted in the Wyoming National Guard as the 1st Regiment and partially organized in 1888 to consist of Company A (organized 29 May 1888 at Laramie as the Laramie Grays) and Company B (organized 12 October 1888 at Cheyenne as the Cheyenne Guards). Redesignated in 1890 as the 1st Regiment, Wyoming Infantry. (Company A at Laramie, Com-

pany B at Lander, Company F at Douglas, Company G at Sheridan and Company H at Evanston mustered into Federal service 7-10 May 1898 at Cheyenne as 1st Separate Battalion Wyoming Volunteer Infantry and after service in the Philippine Islands, mustered out 27 September 1899 at San Francisco, California). Reorganized in late 1899 as the 2d Regiment Wyoming Infantry and further redesignated in 1903 as the 3d Regiment, Wyoming Infantry.

Broken up 29 April 1915 and reorganized as 1st and 2d Separate Battalions and Separate Company I, Wyoming Infantry. (1st and 2d Separate Battalions mustered into Federal service 4 July 1916 at Cheyenne for Mexican border service and stationed at Deming, New Mexico mustered out 9 March 1917 at Fort D. A. Russell, Wyoming). 1st and 2d Separate Battalions consolidated, reorganized and redesignated 23 June 1917 as the 3d Regiment, Wyoming Infantry. Drafted into Federal service 5 August 1917 at home stations.

Broken up and elements converted, reorganized and redesignated as follows:

Headquarters and Headquarters Company, Supply Company and 1st Battalion consolidated 19 September 1917 with the 148th Field Artillery, an element of the 41st Division demobilized in June 1919 at Fort D. A. Russell

2d and 3d Battalion consolidated and redesignated 20 September 1917 as the 116th Ammunition Train, an element of the 41st Division; demobilized in March 1919 at Camp Dix New Jersey

Machine Gun Company redesignated 5 October 1917 as Company D, 146th Machine Gun Battalion, an element of the 41st Division; redesignated 2 April 1918 as Company D, 148th Machine Gun Battalion and demobilized 7 March 1919 at Camp Dodge, Iowa

Reconstituted 12 June 1919 as the 1st Regiment, Wyoming Cavalry and organized from new and existing units as follows:

Headquarters Troop organized and Federally recognized 30 September 1921 at Douglas

Headquarters 1st Squadron organized and Federally recognized 27 April 1927 at Cheyenne; Troop A organized and Federally recognized 9 March 1920 at Basin; Troop B organized and Federally recognized 10 March 1920 at Sheridan; Troop C organized and Federally recognized 4 March 1920 at Riverton; and Troop D organized and Federally recognized 6 March 1920 at Lander.

Headquarters 2d Squadron organized and Federally recognized 22 July 1920 at Sheridan; Troop E organized and Federally recognized 11 March 1920 at Sheridan; Troop F organized and Federally recognized 30 April 1920 at Cody; Troop G organized and Federally recognized 29 April 1920 at Lovell; and Troop H organized and Federally recognized 28 June 1920 at Wheatland.

Redesignated 1 May 1922 as the 115th Cavalry. (Headquarters organized and Federally recognized 24 January 1924 at Sheridan and reorganized 11 April 1924 at Cheyenne. Reorganized 1 June 1929 as a three-squadron regiment with elements at locations as follows: 1st Squadron reorganized to consist of Headquarters at Sheridan, Troop A at Lovell and Troop B at Sheridan; 2d Squadron reorganized to consist of Headquarters and Troop F at Laramie and Troop E at Torrington; and 3d Squadron organized with Headquarters at Casper, Troop I at Lander and Troop K at Douglas.

Redesignated 1 November 1940 as 115th Cavalry (Horse-Mechanized) and 3d Squadron absorbed by 1st and 2d Squadrons. Inducted into Federal service 24 February 1941 at home stations. Reorganized and redesignated 19 May 1942 as the 115th Cavalry, Mechanized. Regiment broken up 1 January 1944 and its elements reorganized and redesignated as follows: Headquarters, Headquarters Troop and Service Troop consolidated, reorganized and redesignated Headquarters and Headquarters Troop, 115th Cavalry Group, Mechanized; 1st Squadron as the 115th Cavalry Reconnaissance Squadron, Mechanized; and 2d Squadron as the 126th Cavalry Reconnaissance Squadron, Mechanized.

(Headquarters and Headquarters Troop, 115th Cavalry Group, Mechanized inactivated 22 October 1945 at Camp Myles Standish, Massachusetts; consolidated with the 115th Cavalry.

Reconnaissance Squadron, Mechanized, 29 July 1946)

(115th Cavalry Reconnaissance Squadron, Mechanized, inactivated 6 March 1945 at Camp Polk, Louisiana; redesignated 29 July 1946 as the 300th Armored Field Artillery Battalion)

(126th Cavalry Reconnaissance Squadron, Mechanized, inactivated 15 August 1944 at Fort Jackson, South Carolina; redesignated 29 July 1946 as the 115th Mechanized Cavalry Reconnaissance Squadron; reorganized and Federally recognized 19 September 1946 with Headquarters at Casper; reorganized 1 September 1950 as the 115th and 117th Tank Battalions)

Regiment reconstituted as the 115th Armored Cavalry and organized 1 March 1951 from new and existing units as follows:

Headquarters and Headquarters Company, 197th Armored Cavalry Group at Cheyenne (organized and Federally recognized 29 May 1936 as Company C, 116th Quartermaster Regiment, redesignated 1 April 1939 as Troop A, 24th Reconnaissance Squadron; redesignated 1 November 1940 as Service Troop, 115th Cavalry [Horse-Mechanized]; inducted into Federal service 24 February 1941 at Cheyenne; redesignated 19 May 1942 as Service Troop, 115th Cavalry, Mechanized; consolidated 1 January 1944 with Headquarters and Headquarters Troop, 115th Cavalry Group, Mechanized; inactivated 22 October 1945 at Camp Myles Standish, Massachusetts; Service Troop reconstituted 29 July 1946 and redesignated Headquarters and Headquarters Battery, 197th Field Artillery Group; reorganized and Federally recognized 26 June 1948 at Cheyenne and redesignated 1 September 1950 as Headquarters and Headquarters Company, 197th Armored Cavalry Group), redesignated Headquarters and Headquarters Company

Service Company organized and Federally recognized 24 April 1951 at Casper

Medical Department Detachment, 115th Tank Battalion, at Casper (organized and Federally recognized 19 November 1927 as Medical Department Detachment, 115th Cavalry; redesignated 1 November 1940 as Medical Department Detachment, 115th Cavalry [Horse-Mechanized]; inducted into Federal service 24 February 1941 at Casper; redesignated 19 May 1942 as Medical Department Detachment, 115th Cavalry, Mechanized; redesignated 1 January 1944 as Medical Department Detachment, 115th Cavalry Group, Mechanized; inactivated 22 October 1945 at Camp Myles Standish, Massachusetts; redesignated 29 July 1946 as Medical Department Detachment, 115th Cavalry Reconnaissance Squadron, Mechanized; reorganized and Federally recognized 19 March 1947 at Casper; redesignated 1 September 1950 as Medical Department Detachment, 115th Tank Battalion); redesignated Medical Department Detachment

Headquarters, Headquarters and Service Company, 115th Tank Battalion at Casper (organized and Federally recognized 15 July 1917 as Company L, 3d Regiment, Wyoming Infantry; called into Federal service 25 July 1917 at Casper; drafted in 5 August 1917; redesignated 20 September 1917 as Company D, 116th Ammunition Train, an element of the 41st Division; demobilized in March 1919 at Camp Dix, New Jersey; reorganized and Federally recognized 15 March 1926 at Casper as Headquarters Troop, 58th Cavalry Brigade; redesignated 1 June 1929 as Headquarters Troop, 115th Cavalry; redesignated 1 November 1940 as Headquarters Troop, 115th Cavalry [Horse-Mechanized]; inducted into Federal service 24 February 1941 at Casper; redesignated Headquarters Troop 115th Cavalry, Mechanized, 19 May 1942; redesignated 1 January 1944 as Headquarters and Headquarters Troop, 115th Cavalry Group, Mechanized; inactivated 22 October 1945 at Camp Myles Standish, Massachusetts; redesignated 29 July 1946 as Headquarters, Headquarters and Service Troop, 115th Cavalry Reconnaissance Squadron, Mechanized; reorganized and Federally recognized 19 September 1946 at Casper; redesignated 1 September 1950 as Headquarters, Headquarters and Service Company, 115th Tank Battalion); redesignated Headquarters and Headquarters Company, 1st Battalion

Company A, 115th Tank Battalion at Lander (organized about 1890 at Lander as Com-

pany B, 1st Regiment, Wyoming Infantry and redesignated Company B, 2d Regiment, Wyoming Infantry in 1899; redesignated Company B, Separate Infantry Battalion, Wyoming Infantry about 1900 and redesignated Company B, 3d Regiment, Wyoming Infantry in 1903; redesignated 29 April 1915 as Company B, 1st Separate Battalion, Wyoming Infantry; mustered into Federal service 4 July 1916 for Mexican border service and stationed at Deming, New Mexico; mustered out 9 March 1917 at Fort D. A. Russell, Wyoming; redesignated 23 June 1917 as Company B, 3d Regiment, Wyoming Infantry; drafted into Federal service 5 August 1917 at Lander; company broken up 19 September 1917 and personnel transferred to Batteries D, E and F, 148th Field Artillery; reorganized and Federally recognized 6 March 1920 at Lander as Troop D, 1st Regiment, Wyoming Cavalry; redesignated 1 May 1922 as Troop D, 115th Cavalry; redesignated Troop A, 115th Cavalry, 11 May 1922; redesignated 1 June 1929 as Troop I [less Machine Rifle Platoon], 115th Cavalry; redesignated 1 November 1940 as Troop C [less Light Machine Gun Platoon], 115th Cavalry [Horse-Mechanized]; inducted into Federal service 24 February 1941 at Lander; redesignated Troop C 115th Cavalry, Mechanized, 19 May 1942; redesignated 1 January 1944 as Troop C, 126th Cavalry Reconnaissance Squadron, Mechanized; inactivated 15 August 1944 at Fort Jackson, South Carolina; redesignated Troop A, 115th Mechanized Cavalry Reconnaissance Squadron 29 July 1946; reorganized and Federally recognized 28 March 1947 at Lander; redesignated 1 September 1950 as Company A, 115th Tank Battalion), redesignated Company A

Company B, 115th Tank Battalion at Casper (constituted 8 December 1943 in the Army of the United States as Troop B, 126th Cavalry Reconnaissance Squadron, Mechanized and activated 1 January 1944 at Fort Lewis, Washington; inactivated 15 August 1944 at Fort Jackson, South Carolina; redesignated Troop B, 115th Cavalry Reconnaissance Squadron, Mechanized and allotted to the Wyoming National Guard, 29 July 1946; reorganized and Federally recognized 18 October 1946 at Casper; redesignated 1 September 1950 as Company B, 115th Tank Battalion), redesignated Company B

Company C, 115th Tank Battalion at Riverton (organized and Federally recognized 4 March 1920 as Troop C, 1st Regiment, Wyoming Cavalry; redesignated 1 May 1922 as Troop C, 115th Cavalry; redesignated 1 June 1929 as Machine Rifle Platoon, Troop I, 115th Cavalry; redesignated Light Machine Gun Platoon, Troop C, 115th Cavalry [Horse-Mechanized], 1 November 1940; inducted into Federal service 24 February 1941 at Riverton; redesignated Light Machine Gun Platoon, Troop C, 115th Cavalry, Mechanized, 19 May 1942; redesignated 1 January 1944 as Detachment, Troop C, 126th Cavalry Reconnaissance Squadron, Mechanized; inactivated 15 August 1944 at Fort Jackson, South Carolina; redesignated Detachment 1, Troop A, 115th Mechanized Cavalry Reconnaissance Squadron, 29 July 1946; reorganized and Federally recognized 5 April 1949 at Riverton; redesignated 1 September 1950 as Company C, 11th Tank Battalion), redesignated Company C

Headquarters, Headquarters and Service Company, 117th Tank Battalion at Douglas (organized about 1890 at Douglas as Company F, 1st Regiment, Wyoming Infantry; mustered into Federal service in May 1898 at Cheyenne as element, 1st Separate Battalion, Wyoming Volunteer Infantry and served in the Philippine Islands; mustered out 23 September 1899 at San Francisco, California and reorganized as Company F, 2d Regiment, Wyoming Infantry; redesignated Company F, Separate Battalion, Wyoming Infantry about 1900; redesignated Company F, 3d Regiment, Wyoming Infantry in 1903; redesignated 29 April 1915 as Company F, 1st Separate Battalion, Wyoming Infantry; mustered into Federal service 4 July 1916 at Douglas for Mexican border duty and stationed at Deming, New Mexico; mustered out 9 March 1917 at Fort D. A. Russell, Wyoming; redesignated 23 June 1917 as Company F, 3d Regiment, Wyoming Infantry; drafted into Federal service 5 August 1917 at Douglas; redesignated 20 September 1917 as Company C, 116th Ammunition

Train; demobilized at Camp Dix, New Jersey in March 1919; reorganized and Federally recognized 30 September 1921 at Douglas as Headquarters Troop, 1st Regiment, Wyoming Cavalry; redesignated 1 May 1922 as Headquarters Troop, 115th Cavalry; redesignated 28 February 1924 as Troop F, 115th Cavalry; redesignated 1 June 1929 as Troop K [less Machine Rifle Platoon] 115th Cavalry; redesignated Troop F [less Machine Rifle Platoon], 115th Cavalry [Horse-Mechanized] 1 November 1940; inducted into Federal service 24 February 1941 at Douglas; redesignated Troop F [less Machine Rifle Platoon], 115th Cavalry, Mechanized, 19 May 1942; redesignated 1 January 1944 as Company F, 126th Cavalry Reconnaissance Squadron, Mechanized; inactivated 15 August 1944 at Fort Jackson, South Carolina; redesignated 29 July 1946 as Company F, 115th Mechanized Cavalry Reconnaissance Squadron; reorganized and Federally recognized 28 October 1946 at Douglas; redesignated 1 September 1950 as Headquarters, Headquarters and Service Company, 117th Tank Battalion), redesignated Headquarters and Headquarters Company, 2d Battalion

Company A, 117th Tank Battalion at Newcastle (organized about 1900 as Company A, Separate Battalion, Wyoming Infantry; redesignated Company A, 3d Regiment, Wyoming Infantry in 1903; redesignated 29 April 1915 as Company A, 2d Separate Battalion, Wyoming Infantry; mustered into Federal service 4 July 1916 at Newcastle for Mexican border and stationed at Deming, New Mexico; mustered out 9 March 1917 at Fort D. A. Russell, Wyoming; redesignated 23 June 1917 as Company A, 3d Regiment, Wyoming Infantry; drafted into Federal service 5 August 1917 at Newcastle; redesignated 19 September 1917 as Battery D, 148th Field Artillery, an element of the 41st Division; demobilized at Fort D. A. Russell, Wyoming, in June 1919; reorganized and Federally recognized 11 June 1924 as Troop A, 58th Machine Gun Squadron, Cavalry; redesignated 1 June 1929 as Machine Gun Troop, 115th Cavalry; redesignated 1 November 1940 as 2d Platoon, Troop F, 115th Cavalry [Horse-Mechanized]; inducted into Federal service 24 February 1941 at Newcastle; redesignated 1 January 1944 as Det, Troop F, 126th Cavalry Reconnaissance Squadron, Mechanized; inactivated 15 August 1944 at Fort Jackson, South Carolina; redesignated 29 July 1946 as Troop C, 115th Mechanized Cavalry Reconnaissance Squadron; reorganized and Federally recognized 16 December 1946 at Newcastle; redesignated 1 September 1950 as Company A, 117th Tank Battalion); redesignated Company D.

Company C, 117th Tank Battalion at Gillette (constituted 8 December 1943 in the Army of the United States as Troop E, 126th Cavalry Reconnaissance Squadron, Mechanized and activated 1 January 1944 at Fort Lewis, Washington, inactivated 15 August 1944 at Fort Jackson, South Carolina; redesignated 29 July 1946 as Det 1, Troop C, 115th Mechanized Cavalry Reconnaissance Squadron and allotted to the Wyoming National Guard; reorganized and Federally recognized 6 April 1949 at Gillette; redesignated 1 September 1950 as Company C, 117th Tank Battalion), redesignated Company F.

Howitzer Company, 2d Battalion organized and Federally recognized 21 March 1951 at Laramie

Regiment broken up 16 January 1953 and its elements reorganized and redesignated as follows: Headquarters and Headquarters Company redesignated Headquarters and Headquarters Battery, 115th Field Artillery Group; 1st Battalion redesignated 349th Armored Field Artillery Battalion; 2nd Battalion redesignated 350th Armored Field Artillery Battalion; and Howitzer Company 2d Battalion redesignated Headquarters and Headquarters Battery, 351st Armored Field Artillery Battalion.

CAMPAIGN STREAMERS

War with Spain

Manila

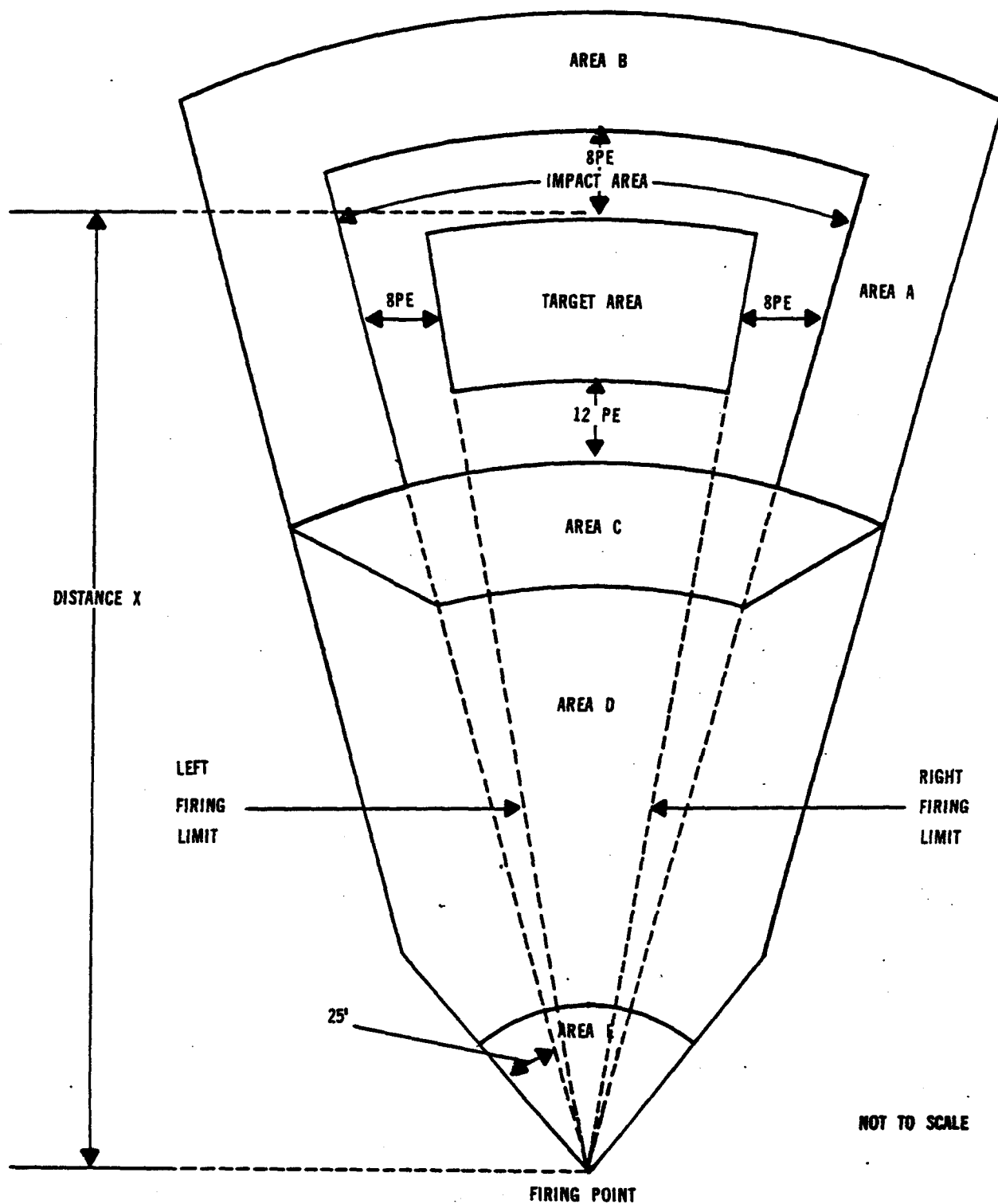
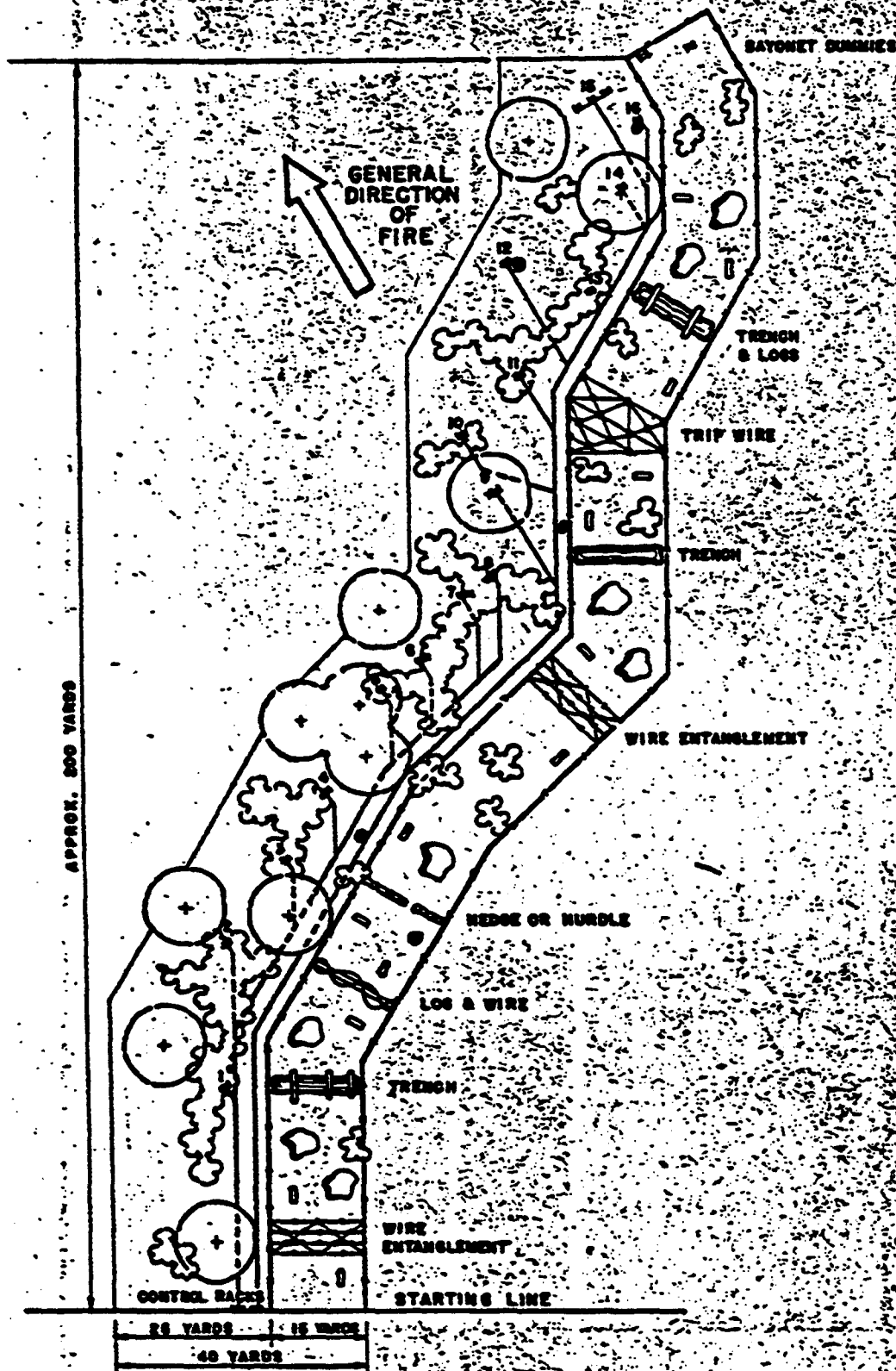


Figure 11-1. Artillery cannon firing at fixed or moving ground targets in the direct mode

CONSTRUCTION OF TARGET RANGES AND LAY-OUT OF VARIOUS OTHER RANGES AND COURSES



AMMUNITION INSPECTION GUIDE

CARTRIDGE, Carbine, Cal. .30, M1.

General. This cartridge is a current standard item of issue for use in the CARBINE, cal. .30, M1.

Visual identification. This cartridge can be readily identified by its characteristic shape.

Components. The cartridge consists of a cartridge case, primer, propelling charge, and bullet. The complete assembly weighs 195 grains. The cartridge case has a slight taper throughout its length. The bullet consists of two parts; a lead alloy core, and the jacket. The bullet weighs 110 grains.

Exterior ballistics, maximum pressure.....31,000 lb per sq in.
Velocity:

At 53 ft.....1,900 ft per sec

At muzzle.....2,000 ft per sec

Accuracy. When test fired, it will group within a mean radius of 4 inches at 300 feet.

SHELL, Shotgun, 12-gage.

General. Shotgun shells are procured by the Ordnance Department from several manufacturers for use in 12-gage sporting and riot-type shotguns. They are intended for guard or combat use and for hunting or trap shooting.

Visual identification. Shells for guard and combat use have a brass head extending at least 1 inch along the case. Shells for sporting use have a head extending only ½ inch along the case.

Components. The shell consists of a case, a primer, several wads, a propelling charge, and a load of lead shot.

The case consists of a brass head and a paper case or shell body. In guard or combat shells, the head extends a distance of 1 inch along the case. (In some shells, the entire case is of brass.) In sporting shells, the head extends ½ inch. The head is reinforced by a base of compressed paper in which the primer pocket is formed. Some paper shells have a steel reinforcement, called the lining, under the brass head. The shell body is made of paper and waterproofed. The head is attached to the shell body by crimping.

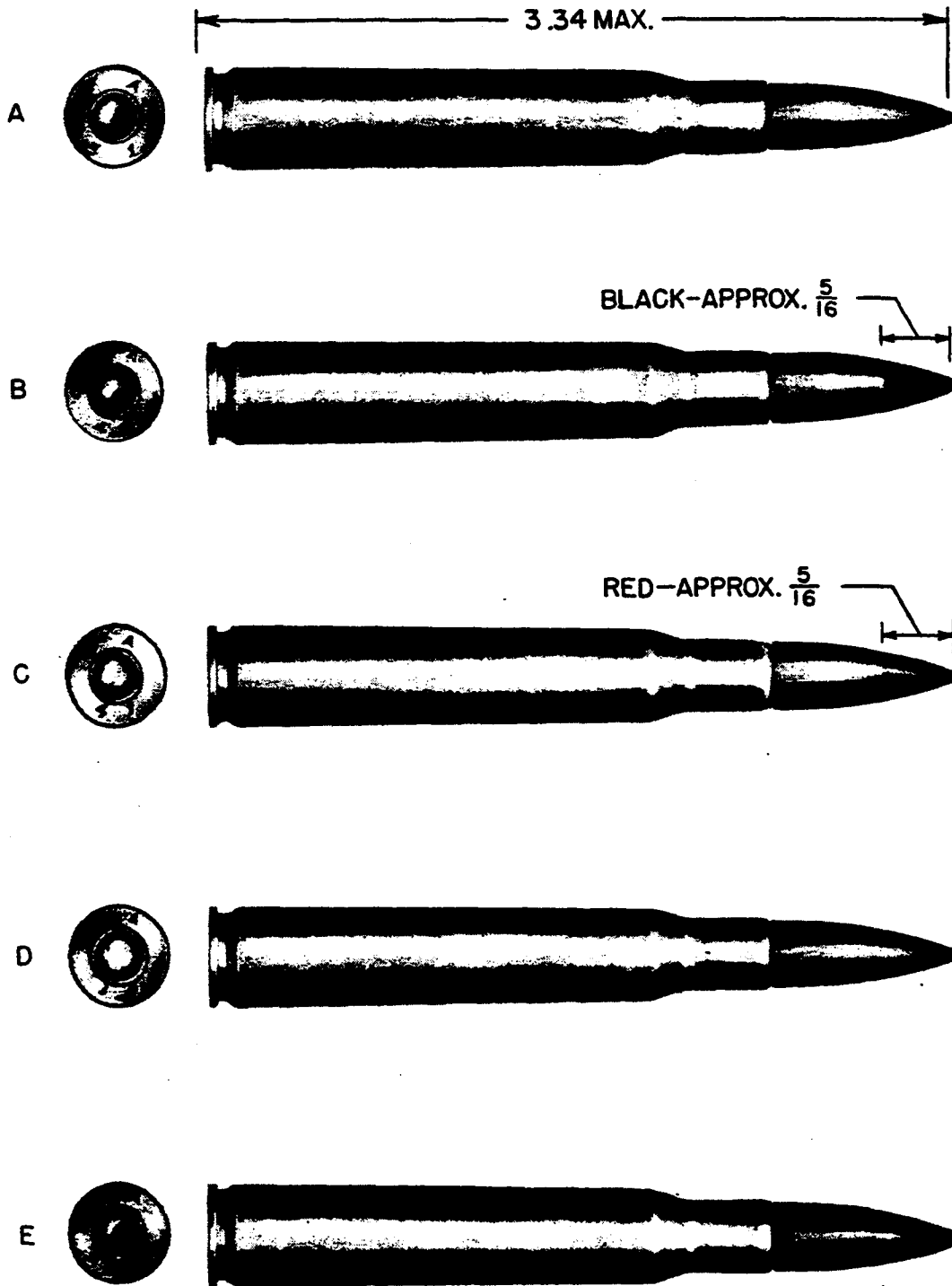
The primer is a commercial type suitable for ignition of the smokeless powder used.

The size of the leadshot for each type is as follows:

Guard or combat.....	No. 00 buckshot
	No. 4 chilled shot
Sporting	No. 7½ chilled shot
	No. 9 chilled shot

The arrangement of the wads (paper and felt) is shown in the illustration.-

SMALL ARMS AND TRENCH WARFARE



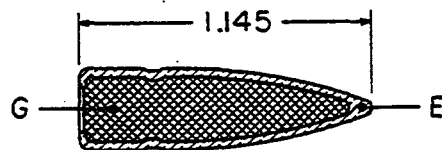
- A—CARTRIDGE, ARMOR-PIERCING, CAL..30, M2
- B—CARTRIDGE, BALL, CAL..30, M2
- C—CARTRIDGE, TRACER, CAL..30, M1
- D—CARTRIDGE, BALL, CAL..30, M1
- E—CARTRIDGE, BALL, CAL..30, M2, NATIONAL MATCH

RA PD 4522

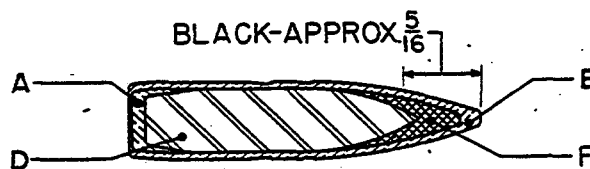
Figure 79a — Cartridges, Cal. .30

AMMUNITION INSPECTION GUIDE

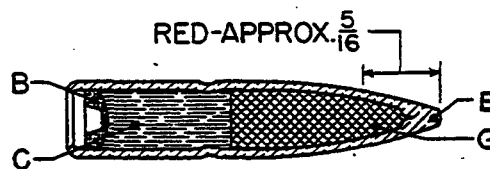
A-BASE FILLER-GILDING METAL
 B-COMPOSITION, IGNITER
 C-COMPOSITION, TRACER
 D-CORE-TUNGSTEN CHROME STEEL
 E-JACKET-GILDING METAL
 F-POINT FILLER-LEAD "T" SHOT
 G-SLUG-LEAD WITH ANTIMONY



BULLET, BALL, CAL. .30, M2



BULLET, ARMOR-PIERCING, CAL. .30, M2



BULLET, TRACER, CAL. .30, M1.

RA PD 4511A

Figure 78b — Bullets, Cal. .30 — Sectioned

Visual identification. The cartridge resembles the CARTRIDGE, ball, cal. .30, M2, in outward appearance, but it may be identified by the light blue paint on the tip of the bullet.

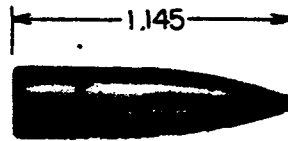
Components. The cartridge consists of a cartridge case, primer, propelling charge, and bullet.

The bullet consists of four parts: a gilding metal jacket, a hollow steel cylindrical core, an incendiary composition, and a lead base filler. The mouth of the cartridge case is crimped into the knurled cannelure at assembly and a minimum pull of 45 pounds is required to remove the bullet from the case.

CARTRIDGE, Rifle Grenade, Cal. .30, M3.

General. This cartridge is used in cal. .30 Rifles, M1, M1903, M1903A1, and M1917, for discharging antitank rifle grenades. This

SMALL ARMS AND TRENCH WARFARE



BULLET, BALL, CAL. .30, M2



BULLET, ARMOR-PIERCING, CAL. .30, M2



BULLET, TRACER, CAL. .30, M1

RA PD 4521

Figure 78a — Bullets, Cal. .30

ling charge when the cartridge is fired. The tracer composition burns with a bright red flame which enables the course of the bullet to be followed by the gunner. The mouth of the cartridge case is crimped into the knurled cannellure at assembly, and a minimum pull of 45 pounds is required to remove the bullet from the case.

Exterior ballistics, maximum range (approx.)3,450 yd

Range of trace.....trace begins at a distance not greater than
125 yd from the weapon, and bullets continue tracing to 750 yd from the weapon

Average maximum pressure.....50,000 lb per sq in.

Velocity:

At 78 ft.....2,650 ft per sec

At muzzle2,715 ft per sec

Accuracy. Average of mean radii of all targets at 600 yards less than 15 inches.

Trajectory. This ammunition is designed so that the bullet's trajectory will cross the trajectory of Ball M2, and AP, M2 Ammunition of the same caliber at approximately 600 yards.

CARTRIDGE, Incendiary, Cal. .30, M1.

General. This cartridge is a standard item of issue for machine guns.

SMALL ARMS AND TRENCH WARFARE

CARTRIDGE, High-pressure, Test, Cal. .30, M1. This cartridge is used for proof-firing rifles, automatic rifles, and machine guns. It is loaded with a powder charge sufficient to give a breech pressure of approximately 68,000 pounds per square inch. Due to this excessive pressure, and the consequent danger involved in firing, the guns under test are fired from a fixed rest under a hood by means of a mechanical firing device. This cartridge may be fired only by authorized personnel.

Visual identification. This cartridge is identified by its tinned cartridge case. Some models have the word "Test" stamped on the head.

Components. The cartridge consists of a cartridge case, primer, propelling charge, and bullet. The complete assembly weighs approximately 433 grains.

The cartridge case is the same as those used in the service cartridges and is further identified by being tinned.

The bullet consists of a gilding metal jacket encasing a hardened lead core, and has a cylindrical base. Its over-all length is 1.235 inches. The mouth of the case is crimped into the knurled cannelure at assembly and a pull of not less than 40 pounds is required to remove the bullet from the case.

AMMUNITION, CAL. .45.

General. The ammunition described in this discussion is designed for use in all standard revolvers, pistols, and submachine guns of cal. .45. It includes cartridges of the following types: ball, tracer, blank, dummy, and high-pressure test.

CARTRIDGE, Ball, Cal. .45, M1911.

General. This cartridge is a current standard item of issue and is used in the Automatic Pistol M1911 and M1911A1, the Colt Revolver M1917, the Smith and Wesson Revolver M1917, and the Thompson Submachine Gun M1928 and M1928A1 against personnel. To adapt it for use in the revolvers, it must be assembled in clips designed for this purpose.

Components. The cartridge consists of the cartridge case, primer, propelling charge, and the bullet. The complete assembly weighs approximately 327 grains.

The bullet has a round nose and a flat base. It consists of two parts, a gilding metal jacket and a slug of lead hardened with antimony. In early designs, bullet jackets were made of cupronickel and these have a silvery appearance. This was later changed to gilding metal which was given a thin tin wash which has a close resemblance to the cupronickel jacket. The practice of tinning the jackets has since been discontinued and the bullets of current design have the natural copper color of gilding metal. The over-all length of the

AMMUNITION INSPECTION GUIDE

bullet is 0.68 inch. The mouth of the case may be crimped to the bullet and a pull of approximately 40 pounds is required to remove the bullet from the case.

Exterior ballistics, maximum range:

In pistol	1,600 yd
In submachine gun.....	1,700 yd
Pressure.....	14,000 lb per sq in.

Velocity:

Pistol:

At 25.5 ft.....	820 ft per sec
At muzzle	825 ft per sec

Submachine gun:

At 25.5 ft.....	885 ft per sec
At muzzle	990 ft per sec

Muzzle energy:

In pistol	329 ft-lb
In submachine gun.....	383 ft-lb

CARTRIDGE, Tracer, Cal. .45, M1.

General. This cartridge was a standard item of issue for use in the Thompson Submachine Gun M1928A1 for observation of fire and incendiary purposes. It was also used for signal purposes in the automatic pistol. The M1 Cartridges have now been declared grade 3 and are not to be issued.

Visual identification. The cartridge is readily identified by its red tipped bullet, and the fact that the cartridge case has no cannelure.

Components. The cartridge consists of the cartridge case, primer, propelling charge, and bullet. The complete assembly weighs approximately 303 grains.

The bullet has a round nose and a cylindrical base. It consists of four parts: a gilding metal jacket, which is painted red for approximately $\frac{3}{16}$ inch from the tip; a slug of lead hardened with antimony in the forward portion of the jacket; a tracer mixture in the central portion; and an igniter mixture in the rear portion. The over-all length of the bullet is 0.857 inch. The case may be crimped to the bullet and a pull of approximately 40 pounds is required to extract the bullet from the case.

Exterior ballistics, average maximum pressure.....18,000 lb per sq in.

Velocity, from submachine gun, at 25.5 ft.....975 ft per sec

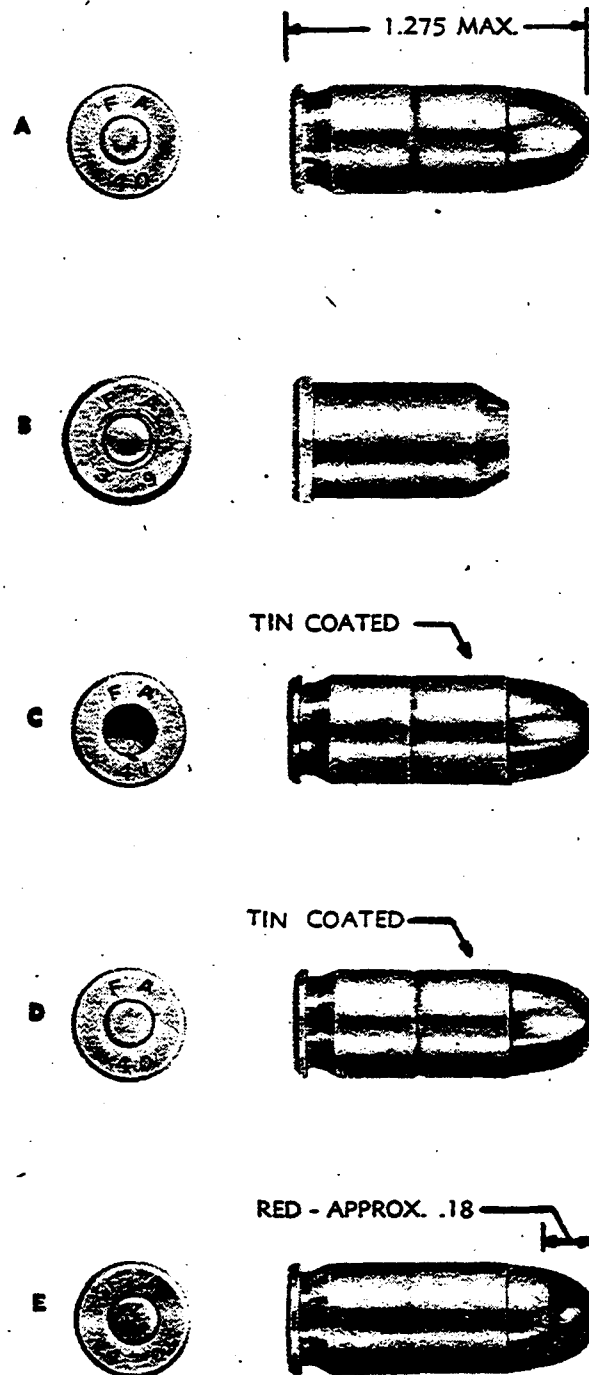
Range of trace.....200 yd

Accuracy. Fires within a mean radius of 8 inches at 100 yards.

CARTRIDGE, Blank, Revolver, Cal. .45, M1.

General. This cartridge is a current standard item of issue for use in the Colt, and Smith and Wesson, cal. .45 Revolvers M1917. It is

AMMUNITION INSPECTION GUIDE



A — CARTRIDGE, BALL, CAL. .45, M1911

B — CARTRIDGE, BLANK, REVOLVER, CAL. .45, M1

C — CARTRIDGE, DUMMY, CAL. .45, M1921

D — CARTRIDGE, HIGH PRESSURE TEST, CAL. .45, M1

E — CARTRIDGE, TRACER, CAL. .45, M1

RA PD 4525

Figure 81 — Cartridges, Cal. .45

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Components. The cartridge consists of the cartridge case, primer, propelling charge, and bullet. The complete assembly weighs approximately 327 grains.

The bullet is the same as that in the CARTRIDGE, ball, M1911.

AMMUNITION, CAL. .50.

General. The ammunition described in this discussion is designed for use in all cal. .50 machine guns. It includes cartridges of the following types: ball, armor-piercing, tracer, incendiary, blank, dummy, and high-pressure test.

CARTRIDGE, Ball, Cal. .50, M2.

General. This cartridge is a standard cartridge for all cal. .50 machine guns.

Visual identification. This cartridge does not have any identification markings and the tip of the bullet is not painted.

Components. The cartridge consists of a cartridge case, primer, propelling charge, and bullet. The complete assembly weighs 1,800 grains.

The bullet consists of three parts: a gilding metal jacket, a soft steel core, and a point filler of lead hardened with antimony. The over-all length of the bullet is 2.29 inches. The base has a 9-degree taper, beginning at a point 0.386 inch from the base. The mouth of the case is crimped into the cannelure at assembly and a minimum pull of 100 pounds is required to extract the bullet from the case. Exterior ballistics, maximum range (approx.).....7,200 yd
Velocity:

At 78 ft.....2,900 ft per sec

At muzzle2,935 ft per sec

Maximum pressure.....52,000 lb per sq in.

Accuracy. At the time of acceptance, this ammunition will group within mean radii not greater than 8.0 inches at 500 yards, or 9.0 inches at 600 yards, when fired from an accuracy rifle held in a V-block.

CARTRIDGE, Armor-piercing, Cal. .50, M2.

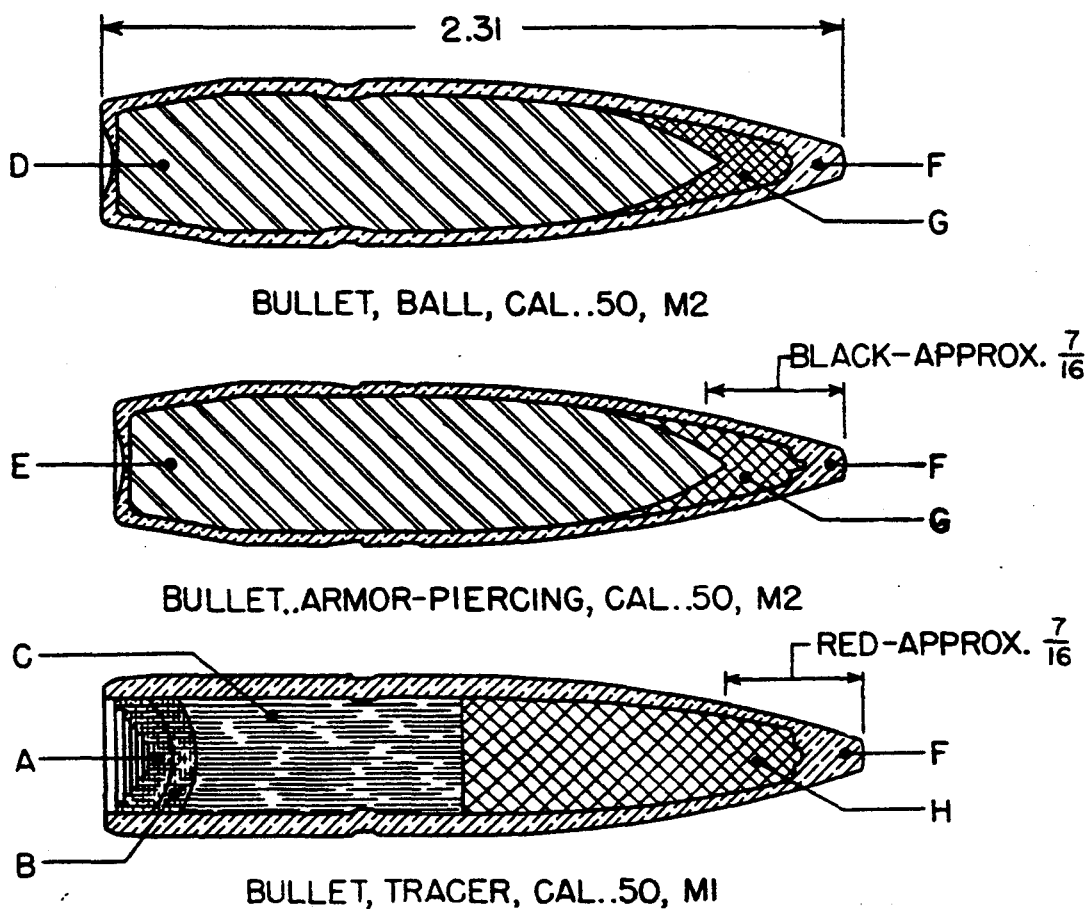
General. This cartridge is a current standard item of issue for all cal. .50 machine guns. It is designed for use against armored aircraft, armored vehicles, concrete shelters, and similar bullet-resisting targets.

Visual identification. This cartridge may be identified by the blackened tip of the bullet.

Components. The cartridge consists of a cartridge case, primer, propelling charge, and bullet. The complete assembly weighs approximately 1,800 grains.

SMALL ARMS AND TRENCH WARFARE

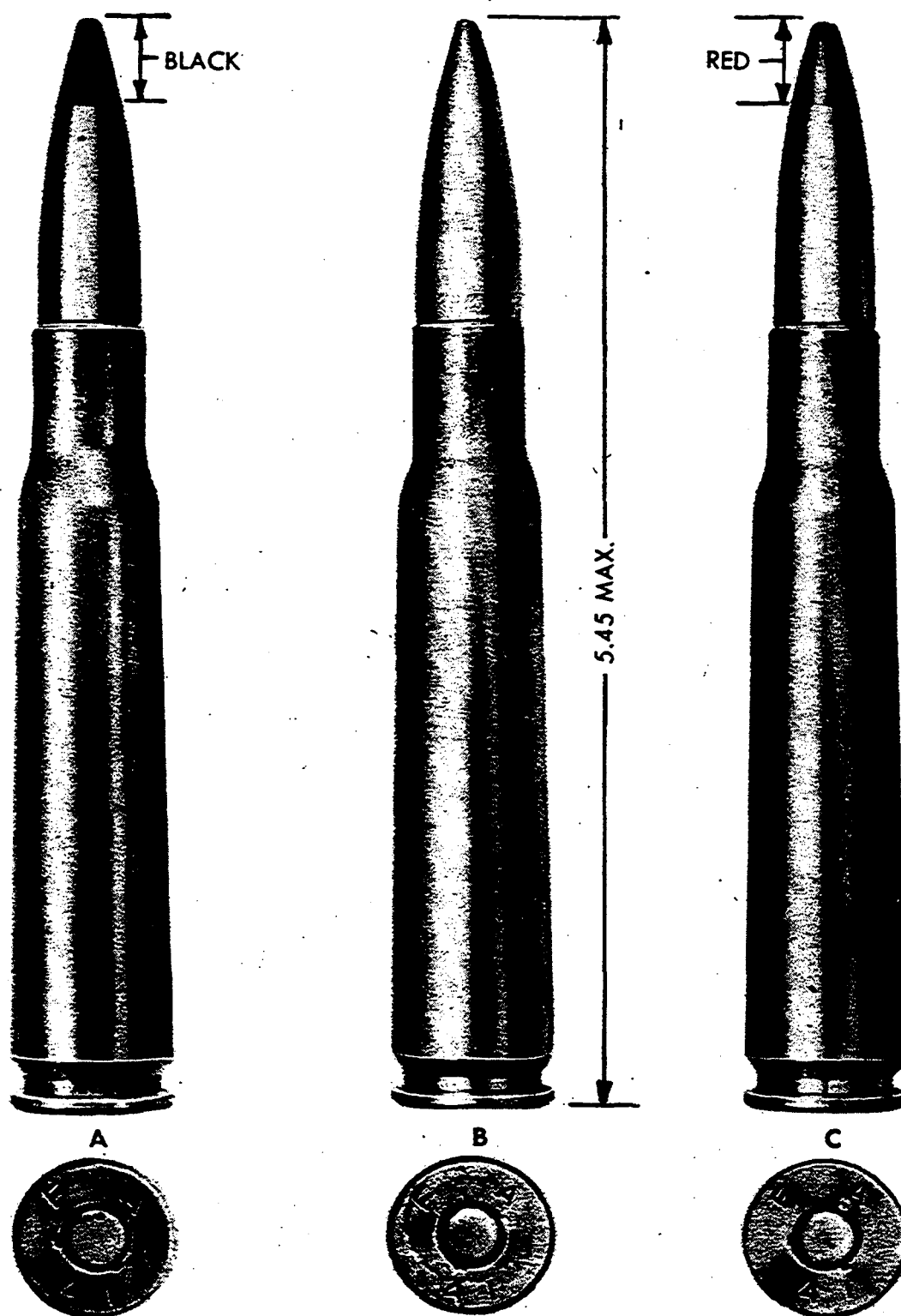
A-COMPOSITION, IGNITER
 B-COMPOSITION, SUB-IGNITER
 C-COMPOSITION, TRACER
 D-CORE-STEEL
 E-CORE-TUNGSTEN CHROME STEEL
 F-JACKET-GILDING METAL
 G-POINT FILLER-LEAD WITH ANTIMONY
 H-SLUG-LEAD WITH ANTIMONY



RA PD 4512

Figure 82b — Bullets, Cal. .50 — Sectioned

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- A—CARTRIDGE, ARMOR-PIERCING CAL. .50, M2
- B—CARTRIDGE, BALL, CAL. .50, M2
- C—CARTRIDGE, TRACER, CAL. .50, M1

RA PD 2117

Figure 83 — Cartridges, Cal. .50
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SECTION IV

AMMUNITION FOR 37-MM GUNS, M3, M5 AND M6
(ANTI-TANK AND TANK)

	Paragraph
General-----	189
Weapons -----	190
Types of projectiles -----	191
Shell, H.E., M63 -----	192
Shell, H.E., Mk. II -----	193
Shot, A.P., M74 -----	194
Shot, A.P.C., M51B1 -----	195
Canister, M2 -----	196

189. GENERAL. - a. Introduction. - The slowly moving, lightly armored vehicles of World War I were successfully combatted by the 37-mm, M1916, and 75-mm guns, but the high speed and modern type armor plate of modern vehicles has limited the use of these weapons considerably. This has resulted in the development of the mobile 37-mm anti-tank gun, M3, and the tank guns, M5 and M6.

b. Reference. - Proper nomenclature for ammunition described herein is given in SNL R-1.

190. WEAPONS. - a. These three weapons have the same size chambers and use the same ammunition. The ammunition is of the fixed type and is fired a single shot at a time. These guns are manually operated, the ammunition being loaded and extracted by hand. The rate of fire depends on the efficiency of the gun crew. The maximum rate of fire is approximately 30 rounds per minute, but for sustained periods a rate of approximately 15 rounds per minute can be predicted.

b. Both the M5 and M6 are mounted in tanks. Present light tanks mount 37-mm guns, while certain medium tanks carry 37-mm weapons together with 75-mm guns. The differences between the M5 and M6 guns are that the barrel of the M6 is 3-1/2 calibers (approximately 5.1") longer than that of the M5; the breechblock is operated automatically on the M6; and the M6 mount is provided with a breech operating mechanism.

191. TYPES OF PROJECTILES. - The ammunition provided for these three guns is classified, according to the type of projectile to be fired, as high-explosive, armor-piercing, canister and target practice.

a. High explosive. - High-explosive shell is used against targets of opportunity, where the explosive feature of the shell will prove more destructive than armor-piercing shot.

b. Shot, armor-piercing, and shot, armor-piercing capped. - Armor-piercing projectiles are for general service use, such as against armored vehicles, concrete shelters, and similar bullet-resisting targets. These rounds have built-in tracer compositions but no other explosives.

c. Shot, target practice. - Target-practice shot is for use in target practice and for general field training. The projectile bears tracer compound to facilitate fire adjustment, but it contains no explosive charge.

d. Canister. - Canister is effective against personnel at the shorter ranges. It contains a number of steel balls, but no explosive charge.

192. SHELL, H.E., M63. - a. Complete round. - The complete round of the high-explosive shell, M63, measures 14.09" in length and weighs approximately 3.03 lbs. The round is shipped complete and fuze. (See fig. 61.)

b. Cartridge case. - The cartridge case, M16, is "Standard" for this round of ammunition. It is 8.75" long and is made of cartridge brass. The case, M16B1 is classified as "Substitute Standard", the only difference between the two cases being that the M16B1 is made of steel and has a slightly thinner primer seat.

c. Propelling charge. - The propelling charge consists of 0.44 lbs. of FNE powder. This charge is designed to impart a muzzle velocity of approximately 2,650 feet per second to the projectile.

d. Primer. - The primer, percussion, 20-grain, M23A2, is "Standard" for use with this round. (See par. 52.)

e. Projectile. - (1) The high-explosive shell, M63, weighs 1.61 lbs. when fired and measures approximately 5.92" in length. It has a fairly long taper, the ogive radius being 13". The bursting charge consists of 0.085 lb. of flaked TNT, which is packed in so as to surround the booster cavity of the fuze on three sides.

(2) The base-detonating fuze, M58, (see par. 107), is used in the M63 shell. This fuze is similar to the M38A1 fuze, used with the old Mk. II high-explosive shell in these guns, but has been made wider to fit the explosive cavity of the M63 shell.

(3) The projectile is painted olive drab to indicate it contains high-explosive filler.

f. Packing. - The complete fixed round of shell, H.E., M63, is packed in individual fiber containers, M58. Twenty containers (20 rounds)

are packed in an unlined wooden box making a total weight of 91 lbs.

193. SHELL, H.E., MK. II. - a. The Mk. II high-explosive shell for antitank guns is classified as "Limited Standard" and is no longer being manufactured. It is very similar to the Mk. II shell for the 37-mm gun M1916, except for the cartridge case. The M16 cartridge case replaces the Mk. IA2 case used with the M1916 gun.

b. The Mk. II shell is packed 20 rounds per metal-lined box.

194. SHOT, A.P., M74. - a. Complete round. - The complete round of shot, A.P., M74, weighs 3.34 lbs. and measures approximately 13" in length. The round is shipped complete since it is of the fixed type of ammunition.

b. Cartridge case. - The cartridge case, M16, is "Standard" for this round, and the case, M16B1, is "Substitute Standard" (see par. 192b).

c. Propelling charge. - The propelling charge for this shell consists of 8.1 oz. (0.506 lbs.) of FNH powder. This charge gives the projectile a muzzle velocity of approximately 2,600 feet per second.

d. Primer. - The primer, percussion, 20-grain, M23A2, is used in this round of ammunition. (See par. 52.)

e. Projectile. - (1) The shot, M74, is in the form of a solid steel slug measuring 4.84" in length and weighing 1.92 lbs. It has a comparatively blunt nose, for the ogive radius is 2.205".

(2) In the rear of the shot there is a cavity to hold tracer composition. This built-in tracer helps artillery crews to observe the fire of the weapon.

(3) This shot is identical to that used in the 37-mm gun, M1A2. The complete rounds of the two projectiles differ in respect to the cartridge case and the propelling charge, but the shot are exactly the same.

(4) The shot is painted black to signify that it is inert.

195. SHOT, A.P.C., M51. - a. Complete round. - The complete round of shot, armor-piercing capped, M51B1, (see fig. 59) weighs 3.41 lbs. and measures 14.53" in length.

b. Cartridge case. - The cartridge case, M16, is "Standard" for this round, and the case, M16B1, is "Substitute Standard" (see par. 192b).

c. Propelling charge. - The propelling charge for this round con-

sists of 8.1 oz. of FNH powder. The projectile thus is given a muzzle velocity of approximately 2,900 feet per second.

d. Primer. - The primer, percussion, 20-grain, M23A2, is "Standard" for use in this round of ammunition.

e. Projectile. - (1) This projectile is made up of three separate components; the body, the cap, and the windshield. The body is made of very hard steel and it does the actual penetrating. The cap is made of a soft metal sweated on the front of the body and serves as a cushion or guide for the body when it strikes armor plate. The windshield is a false ogive or point, made of an aluminum alloy, which is screwed over the cap. The body of this projectile is a solid shot and contains no fuze or bursting charge.

(2) The projectile contains a red tracer which burns for about 2,000 yards. The projectile weighs 1.92 lbs. and is 6.36" long with the windshield screwed in place and 4.63" long without the windshield. The windshield has an ogive radius of 13", so that it continues the taper of the armor-piercing cap.

(3) Aside from the tracer composition, the projectile is completely inert. Accordingly, the shot is painted black.

(4) The shot, A.P.C., M51B1, is identical with the shot, A.P.C., M59, used with the 37-mm gun, M1A2, with the exception that in the latter there is no windshield because of the design of the chamber of the gun.

(5) The body and cap of the shot may be made in one piece, maintaining the exterior dimensions of the two-piece projectile. Approximately 50,000 rounds of such shot not heat-treated have been manufactured for target practice purposes and designated shot, T.P. (target practice), M51. Future requirements will be met by supplying the standard M51B1 round.

f. Packing. - There are two types of packing for this complete round.

(1) The complete round may be packed 20 rounds per metal-lined box, the total weighing 101 lbs.

(2) The complete round may be packed in individual fiber containers, 20 of these containers (20 rounds) being packed in an unlined box, the loaded box weighing 101 lbs.

196. CANISTER, M2. - a. Complete round. - The complete round of canister, M2, is of the fixed type of ammunition measuring 14.53" in length and weighing 3.31 lbs. (See fig. 61).

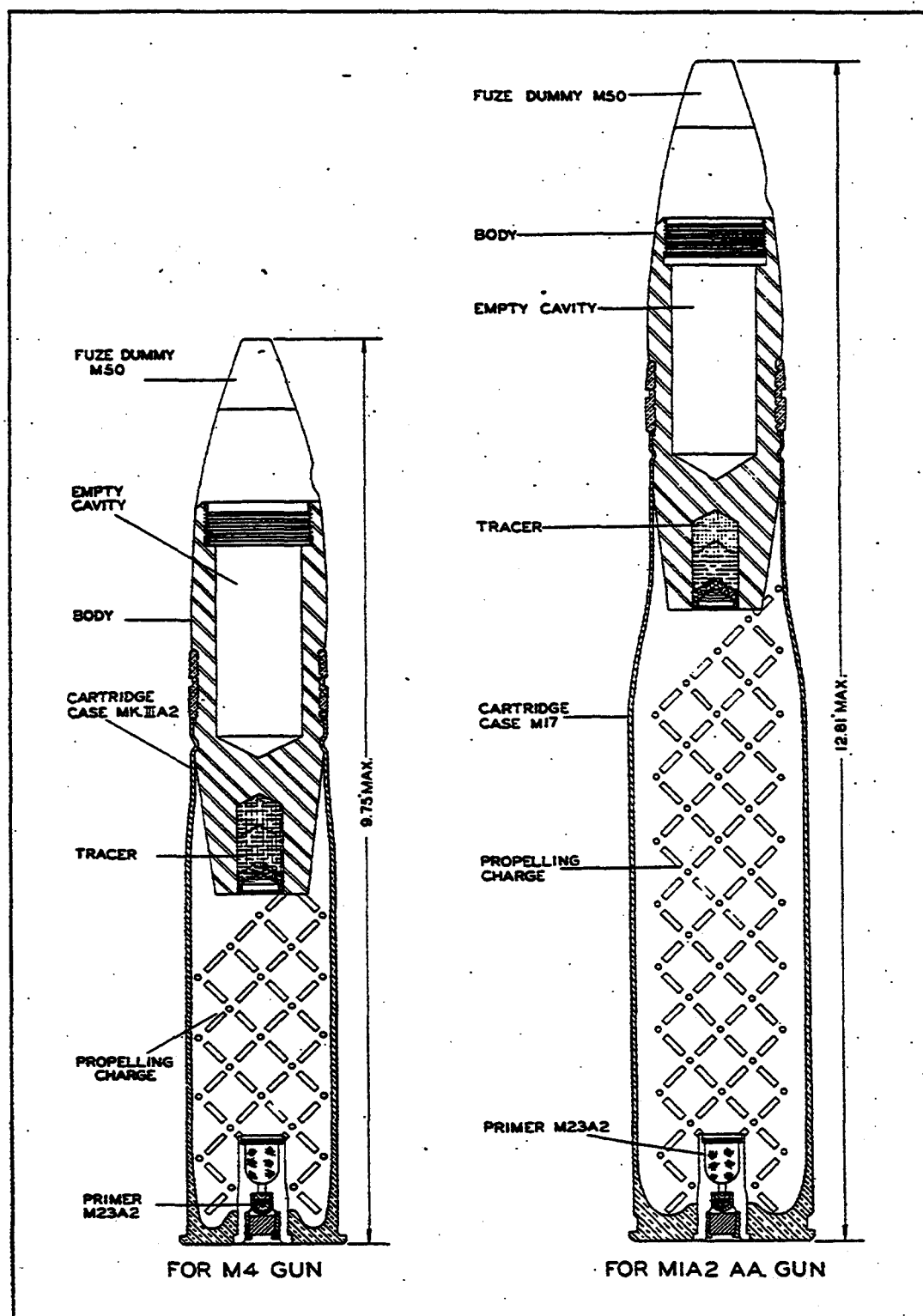


FIGURE 60. - SHELL, PRACTICE, M55A1, FOR 37-MM GUNS, M4 AND M1A2.

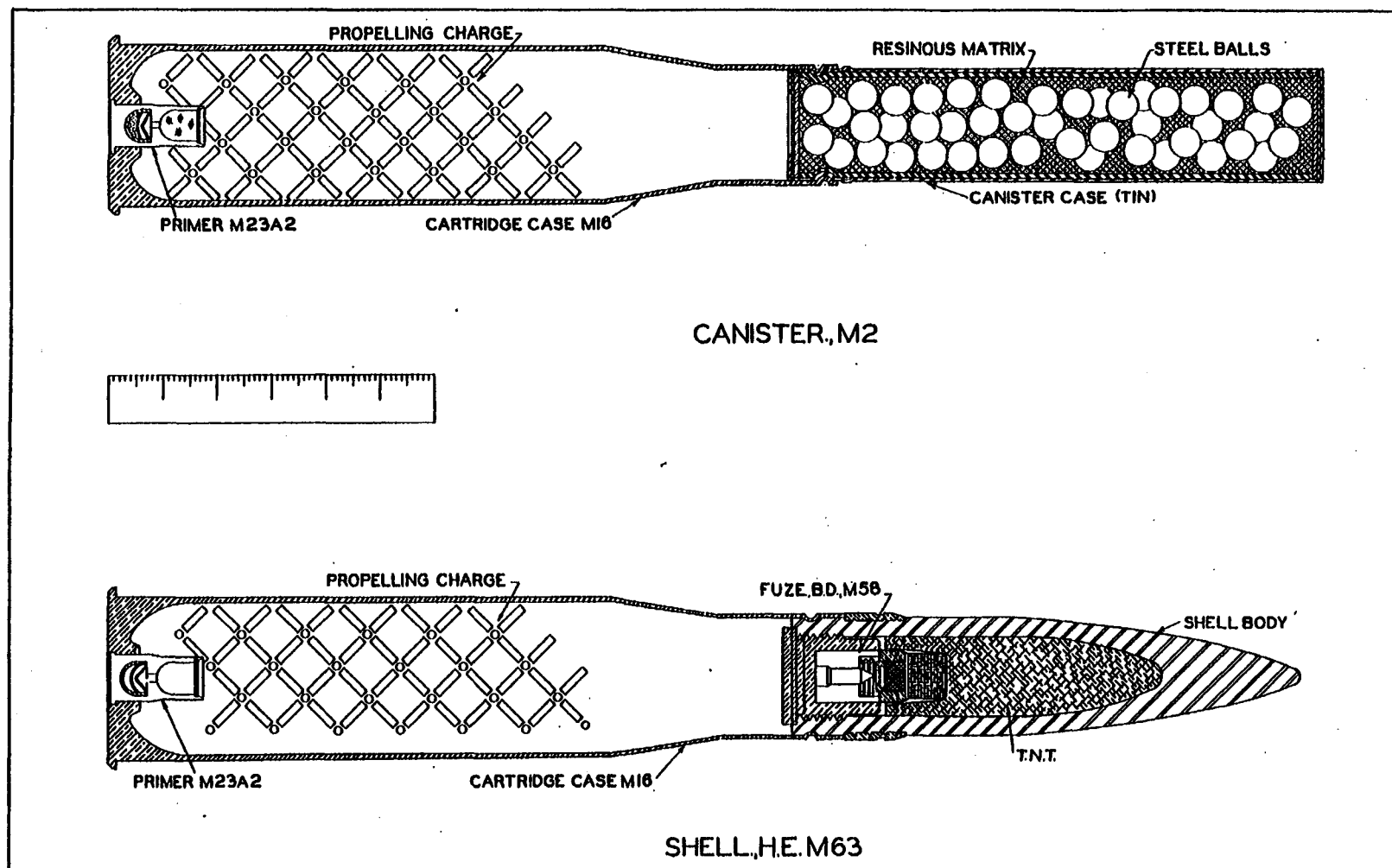
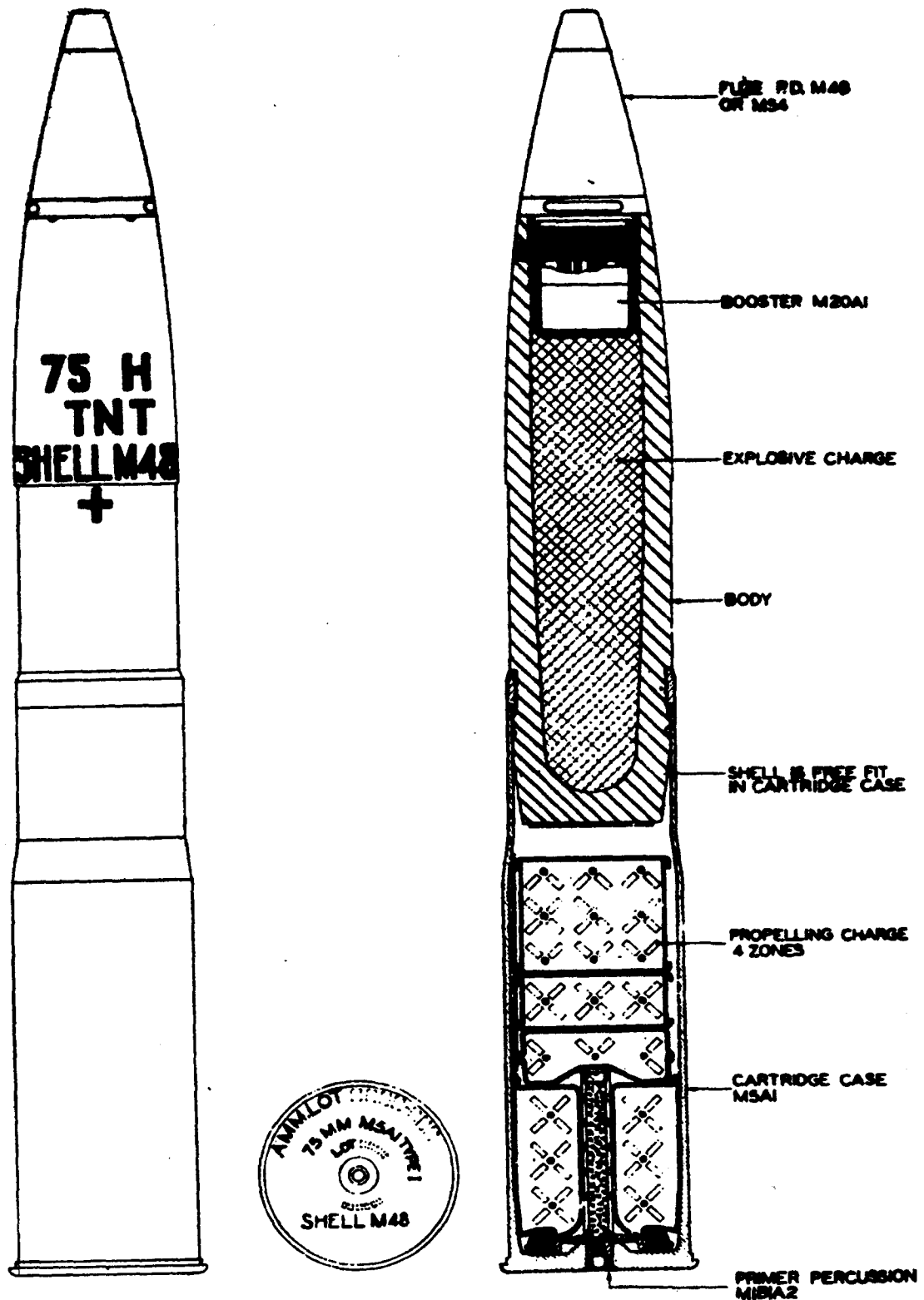


FIGURE 61. - CANISTER, M2, AND SHELL, H.E., M63, FOR 37-MM GUNS, M3, M5 AND M6

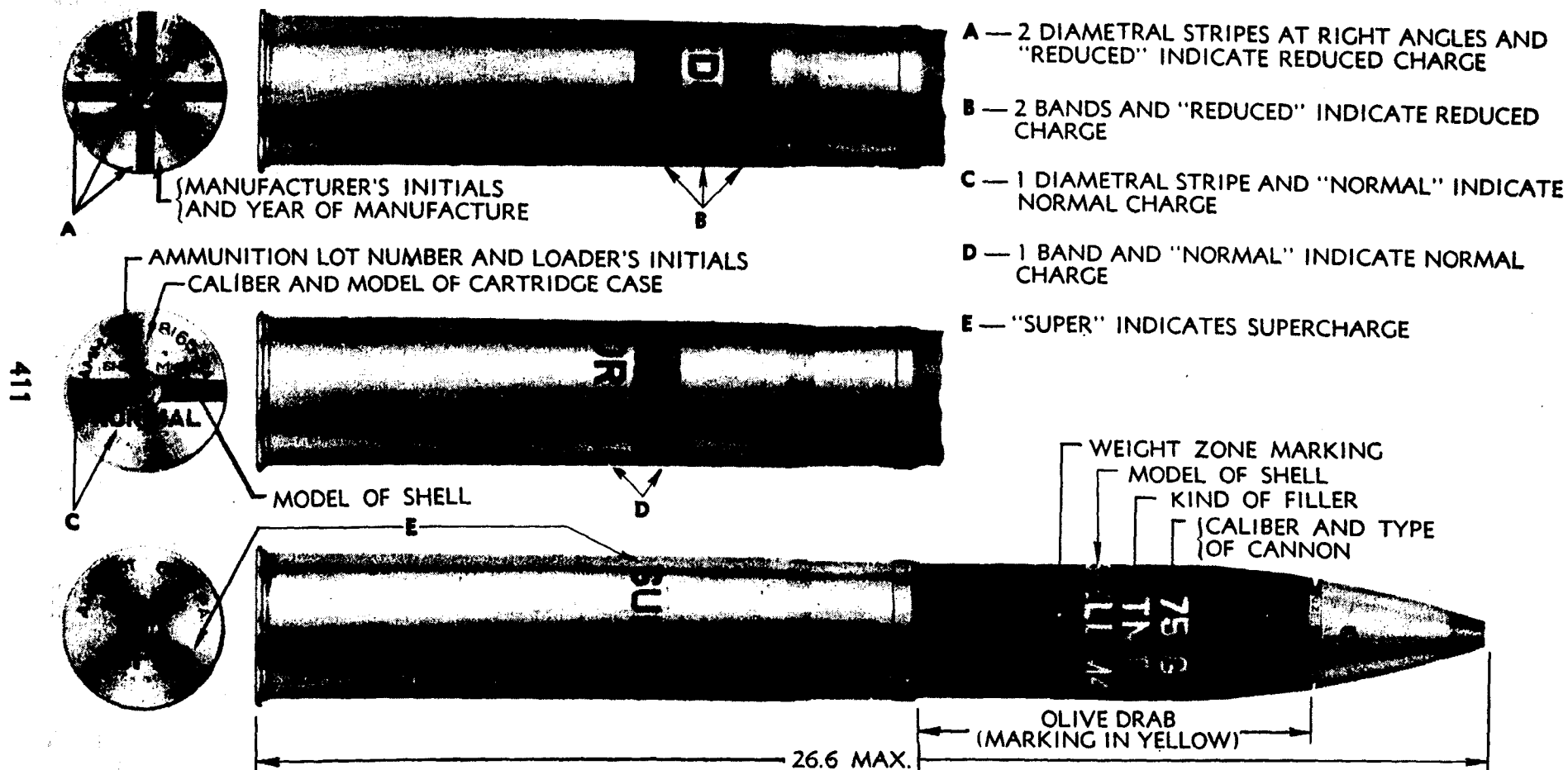
AMMUNITION FOR 75-MM PACK AND FIELD HOWITZERS

Complete Round	Projectile	Filler	Fuze	Booster	Cartridge Case	Propellant	Primer	Class	Issued	Standard
Shell, H.E., AT, M66	M66	50/50 Pentolite	M62 B.D.	M5A1 M5A1B1 Type II	FNH loose .104 lb.	M1B1A2	Fixed	Fuzed	S & M
436 Shell, H.E., M48	M48	TNT	M48 M48A1 M54	M20 M20A1	M5A1 M5A1B1 Type I	FNH 4 zones Base and increment	M1B1A2	Semifixed	Fuzed	S & M
Shell, H.E., M41A1	M41A1	TNT	M48 M48A1 M54	M20 M20A1	M5A1 M5A1B1 Type I	FNH 4 zones Base and increment	M1B1A2	Semifixed	Fuzed	S & M
Shell, chemical; M64	M64	H, FS, WP	M57	M8 Burstor	M5A1 M5A1B1 Type I	FNH 4 zones Base and increment	M1B1A2	Semifixed	Fuzed	S & M

ARTILLERY AMMUNITION



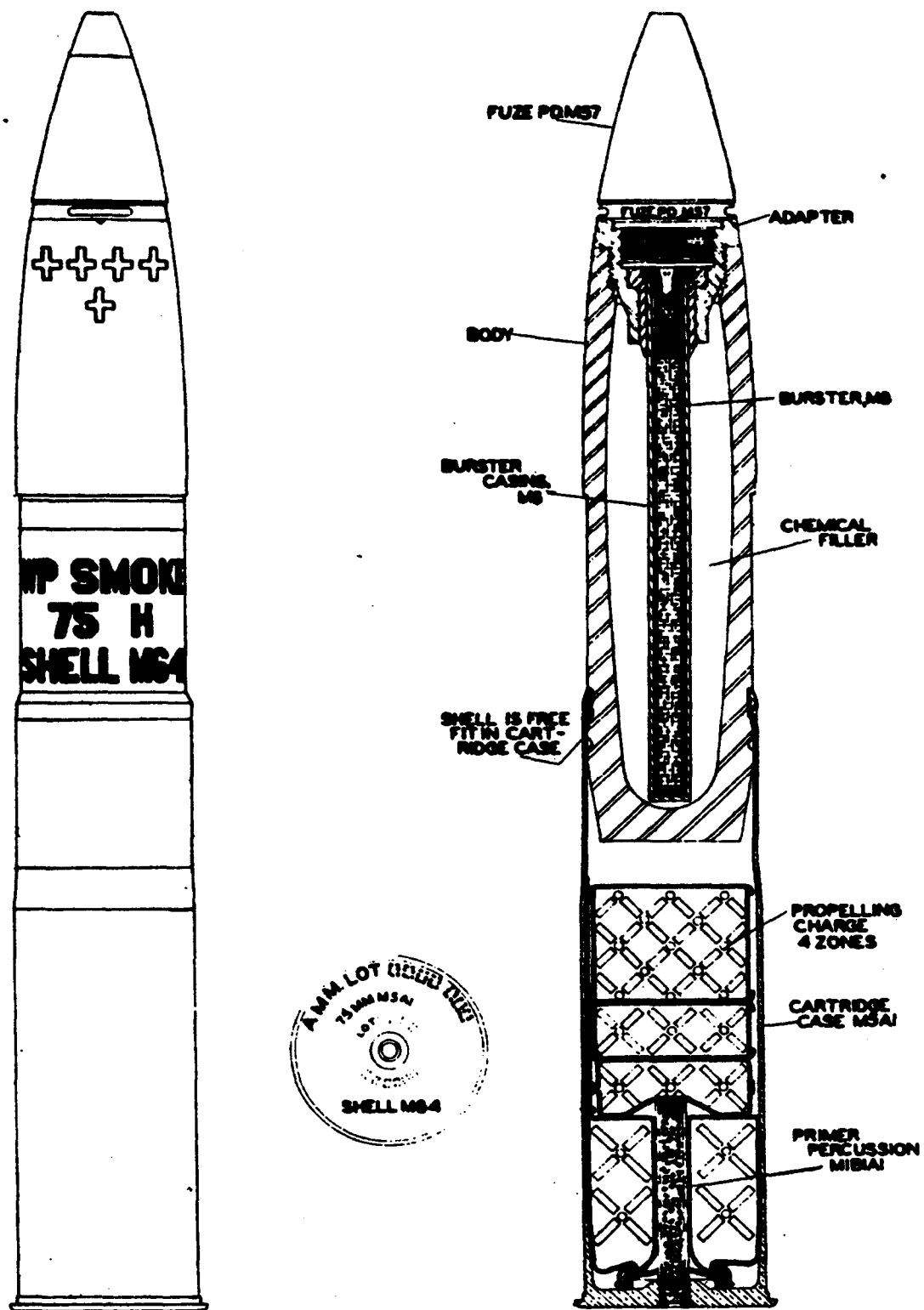
RA .PD 22956



RA PD 49589B

Figure 165 — SHELL, H.E., M48, for 75-mm Guns

ARTILLERY AMMUNITION



RA PD 22958

Figure 174 — SHELL, Semifixed, Smoke, WP, M64

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SHELL, H.E., M48.

General. This complete round as issued may be used against personnel, for demolition of above-ground targets such as barbed wire, for penetration effects against heavier targets, and in barrages. The mean or average weights of the complete round are: for the supercharge, 19.3 pounds; for the normal charge, 18.5 pounds; and for the reduced charge 18.0 pounds.

Projectile M48. This projectile is of the streamlined type with a 9-degree tapered or boat-tailed base and a 7.5-caliber radius of ogive. The streamlining of the projectile is completed by a continuation of the projectile's radius of ogive over the exterior surface of the standard contour fuzes with which it is used. The projectile is made of forged steel; it has a rotating band of gilding metal, a fringing groove, and a steel base cover spot welded to its base. It is also provided with a single groove, between the fringing groove and the boat-tail, for stab crimping of the cartridge case. The booster and fuze assemble directly to the nose of the shell, the booster being tightened in place by a set screw which passes through one side of the nose, and the fuze by staking into notches cut in the rim of the nose. The standard bursting charge consists of 1.49 pounds of TNT and is sufficient to break the shell into approximately 400 effective fragments. The mean weight of the loaded and fuzed projectile is 14.6 pounds. The actual weights, for uniformity of ballistics, are classified into weight zones which are indicated by yellow crosses stenciled below the bourrelet of the shell (fig. 165). The zones and their limiting weights in pounds are shown below.

	Light (+)	Normal (+ +)	Heavy (+ + +)
Minimum	14.22	14.52	14.82
Maximum	14.52	14.82	15.12

The projectile is painted a lusterless olive drab and is stenciled in yellow with the designation of weapon (75G), the designation of filler (TNT), and the complete round designation (Shell M48). In the complete round, the following listed components may be associated with this projectile:

Fuzes M48, M48A1 and M54.

Boosters M20 and M20A1.

Cartridge Cases M18 and M18B1.

Propelling Charges. Reduced, normal, super.

Primers M22A3 (or others of M22-series) and M31.

Guns. This round is provided with all charges for the field guns; with the normal and the supercharges and only the M48 and M48A1

ARTILLERY AMMUNITION

and head (9) as a unit, the rupture occurring at the fine threads between the head and the case (10). The resin matrix is melted and ignited and the lead balls are ejected from the case in a whirling cone-shaped pattern due to the rotation of the projectile. They have a velocity of 350 feet per second in addition to the velocity of the projectile at the time of bursting. The shrapnel case recoils to the rear. The projectile is not weight-zoned, since it is possible to bring it exactly to weight by varying the number of lead balls added at the time of loading. It is painted red and stenciled in black with the designations of weapon, and complete round. The components associated with it in the complete round are:

Fuze M1907M.

Cartridge Case M18.

Propelling Charge. A normal charge of 1.69 pounds of powder which imparts a muzzle velocity of about 1,755 feet per second.

Primer M1B1A1.

Guns. This round is issued for the 75-mm field guns only.

NOTES: This round is standard for issue only and is issued fuzed.

PACKING.

The present standard packing for 75-mm gun rounds is one round per fiber container, three rounds in containers per bundle. Other packings which may be found in storage are:

One round per tin container, 9 rounds per box

One round per fiber container, 9 rounds per box

One round per tin container, 4 rounds per box

One round per fiber container, 4 rounds per box

Overseas Shipment. Bundle packing must be crated in 1-bundle crates which are stained chocolate brown and stenciled in the appropriate color marking for this type of round.

FURTHER REFERENCES: OS—9-20; OS—9-18; TM—9-1900; O.O. 7224, Ordnance Safety Manual; Complete Round Chart No. 5981; SNL R-1; SNL R-3.

Chapter 7

75-mm Howitzer Ammunition

GENERAL.

The 75-mm pack and field howitzers all take the same types of ammunition, namely, at the present time, H.E., A.T. shell, H.E. shell,

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and chemical shell. The tubes themselves of the 75-mm pack and field howitzers do not differ. The difference is in the carriages, the pack howitzer carriage breaking down into mule loads for operation over difficult terrains, and the field howitzer carriage being adapted to high-speed transportation. Other characteristics of the two weapons, such as elevation, traverse, etc., are also similar.

The ammunition provided for the 75-mm howitzer may with one exception, the H.E., AT shell which is fixed, be classified as semifixed. Semifixed ammunition is ammunition loaded in the weapon in one operation, but with the cartridge case loosely fitted to the projectile, permitting the adjustment of the propelling charge at the point of fire. The marking of the projectiles of 75-mm howitzer rounds conforms to the standard color scheme for identification of types of ammunition and will be discussed with the complete rounds.

Many of the components used in rounds for the 75-mm howitzer have been discussed in the section dealing with ammunition for the 75-mm guns. Only the components that vary will be discussed.

BURSTERS.

Burster M8. The M8 Burster is an aluminum tube filled with a cast charge of 70/30 tetrytol and covered at each end with a disc of onionskin paper glued in place.

Burster Casing M6. The Burster Casing M6 is a seamless steel tube closed at one end and fitted with a heavy flanged sleeve at the other. It is tested at 200 pounds per square inch pressure to insure its being gastight.

CARTRIDGE CASES.

Cartridge Case M5A1, Type I. This cartridge case, which is made of drawn brass, is about 10.70 inches in length. The A1 modification consisted of lengthening the case $\frac{3}{16}$ inch in order to keep complete round lengths proportional when the gun rotating band was adopted for howitzer shells. This case weighs approximately 2.45 pounds and is of the flange type for extraction.

Cartridge Case M5A1B, Type I. This cartridge case is similar in all respects to the M5A1 except that it is made from drawn steel and weighs approximately 2.18 pounds.

Cartridge Case M5A1, Type II. This cartridge case was necessitated by the adoption of the SHELL, H.E., AT, M66. The cartridge case is similar in all respects to the type I case with the exception of mouth diameter. The mouth of the type I case has a diameter of 2.938 inches whereas, for crimping to the projectiles, the mouth of the type II case is 2.913 inches in diameter. The B1 modification of the type II case, similarly to that of the type I case, consists of manufacture of the case from steel.

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PROPELLING CHARGE.

The FNH propelling charge has a base section to which a small retainer assembly is attached. The retainer fits over the primer and locks the base charge to it. Three increments are each connected in sequence by means of a string to the base charge. The base and the first increment encircle the primer. The mean weight of the total charge is about a pound, the exact weight being determined by proving-ground test to secure a muzzle velocity of 1,250 feet per second at a pressure not exceeding the maximum allowable. The exact weight and velocity of each charge for a particular powder lot is found on the ammunition data card. The following table shows the characteristics of the charge:

Zone Charge	Components	Total Weight of Charge (oz)	Muzzle Velocity (ft per sec)	Pressure (lb per sq in.)
1	Base	6.7	700	4,500
2	Base and 1 increment	8.48	810	6,400
3	Base and 2 increments	10.75	950	9,300
4	Base and 3 increments	15.55	1250	21,500

SHELL, H.E., M48.

General. This complete round with the exception of cartridge case, primer, propelling charge, and marking is similar to the Gun Round M48.

Projectile M48. Similar to that discussed for 75-mm guns with the exception of the designation of weapon which will be "75 H." The components associated with the projectile are:

Fuzes M48, M48A1, and M54. Discussed in chapter on 75-mm ammunition.

Boosters M20 and M20A1. Discussed in chapter on 75-mm ammunition.

Cartridge Cases M5A1 and M5A1B1.

Propelling Charge. 4 zone, base and increment.

Primer M1B1A2. Discussed in chapter on 75-mm ammunition.

NOTE: This round is standard for issue and manufacture and is issued fuzed.

SHELL, H.E., M41A1.

General. This round is a substitute for the M48 H.E. Shell in the 75-mm howitzer. The projectile is made by cutting off the nose of

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the Mk. IV, H.E. Shell for 75-mm guns and rethreading it to take the new type standard contour fuzes and the M20 Booster. It is standard for manufacture and issue insofar as this modification procedure is concerned.

Projectile M41A1. This projectile is of the new type having an 11-caliber radius of ogive and a boat-tail base with a 9-degree taper. The rotating band is of copper and a steel base plate is soldered to the base. It is a low-capacity shell, one reason for its discontinuance as a gun round, having a bursting charge in the howitzer of 1.11 pounds of TNT. There are only two weight zones in this projectile. The markings of the projectile will be in yellow on an olive-drab base coat, and will include the designation of weapon, filler, complete round, and weight zone. The components associated with this projectile in the complete round are:

Fuzes M48, M48A1, and M54. Discussed in chapter on 75-mm gun ammunition.

Boosters M20 and M20A1. Discussed in chapter on 75-mm gun ammunition.

Cartridge Cases M5A1 and M5A1B1.

Propelling Charge. FNH 4 zone, base and increment.

Primer M1B1A2. Discussed in chapter on 75-mm gun ammunition.

SHELL, CHEMICAL, M64.

General. This round is a new type chemical round, the projectile being equipped with a full length burster. It disperses the chemical agents more efficiently than does the older type chemical round (see SHELL, chemical, Mk. II, in section on 75-mm guns) since the entire projectile is split open. It may be expected that a chemical shell of this type will also be standardized for the 75-mm guns in the near future.

Projectile M64. This projectile is similar to the H.E. Projectile M48 with the exception of an adapter for the burster casing in the nose, and the absence of a base plate. The burster casing is a press-fit in the adapter provided for it. The burster assembles within the burster casing. The standard fillers (chemical agents) for this shell are H, WP, and FS. The marking for these fillers will be similar to that for the same fillers in the SHELL, chemical, Mk. II. There are five weight zones in this projectile. The components associated with it in the complete round are:

Fuze M57. Discussed in chapter on 75-mm gun ammunition.

Burster M8.

Burster Casing M6.

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Cartridge Casings M5A1 and M5A1B1.

Propelling Charge. FNH, 4 zone, base and increment.

Primer M1B1A2. Discussed in chapter on 75-mm gun ammunition.

NOTE: This round is standard for manufacture and issue and is issued fuze. It is a boresafe round.

SHELL, FIXED, H.E., A.T., M66.

General. This round employs the "hollow charge effect" discussed in previous sections on rockets and rifle grenades. It is effective against either face-hardened or homogeneous armor plate and is designed for use against tanks.

Projectile M66. The M66 Projectile is composed of three major parts: namely, the ogive, the cone, and the body. The ogive has two purposes in this instance: first, to set up an effective distance between hollow charge and plate to be penetrated, and second, to streamline the round. It is a straight sided hollow cone which threads into the body and is maintained in position by three set screws which pass through the body.

The cone is held in position between the ogive and the shell body and is designed to form a hollow in the charge (the apex of the cone is to the rear, whereas the apex of the conical ogive is the front or nose of the projectile) which will provide the "hollow charge" or "Munroe effect."

The body or the rear position of the projectile is made of forged steel. It contains a cast charge of approximately 0.75 pound of 50/50 pentolite as a bursting charge. The base of the body is boat-tailed with an approximate 9-degree taper and is provided with a threaded opening to take the M62 B.D. Fuze.

The entire projectile is 15 inches long and weighs 13.1 pounds.

The components associated with this projectile in the complete round are:

Cartridge Case M5A1, Type II, or M5A1B1, Type II. The type II cases were especially designed for this round as it is the first fixed round in the howitzers. The only difference between type II and type I cartridge cases is in the mouth diameter; the mouth of the type II case tapers to a diameter of 2.913 inches, while the mouth of the type I case tapers to a mouth diameter of 2.938 inches. The type II case with its smaller diameter mouth is designed for crimping to the projectile.

Primer. 100-grain, M1B1A2.

Propelling Charge. 1.04 pounds of FNH powder poured loosely into the cartridge case. This charge gives the M66 Projectile a muzzle velocity of approximately 1,000 feet per second without exceeding

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the maximum allowable chamber pressure of 21,500 pounds per square inch. It must be remembered that in this round, velocity is not a factor in penetration, the penetration being accomplished by the hollow charge effect.

Fuze, Base-detonating, M62.

General. The M62 Fuze is a comparatively small device, measuring approximately 1.75 inches in diameter, and 3.5 inches in length. It is designed for use in the H.E., AT shell only.

Description (fig. 175). This fuze consists of two major parts, the head and the body. A recess within the head seats the percussion plunger. The body contains the explosive train which consists of a detonator of priming mixture, lead azide, and tetryl; a slider charge of tetryl; a booster lead charge of tetryl; and a booster charge of tetryl. The booster charge is held within the cavity in the upper end of the body by the booster cup. The body also houses a slider, slider spring, and retaining cap. This device causes the fuze to be boresafe by positively interrupting the explosive train and also by carrying a charge of tetryl out of alinement with the remainder of the explosive train in the unarmed or safe position.

Percussion Plunger Assembly. This assembly consists of a body, in a slotted portion of which is housed an eccentrically pivoted firing pin which is rotary in nature. The pin is held in a safe position by two centrifugal pins and springs. Two recesses, one on either side of the slot on the top of the body, house restraining springs and their caps.

Slider assembly. This assembly consists of an eccentric charge-carrying slider very similar in its shape to that of the M56 P.D. Fuze mentioned as a component of 37-mm ammunition, a slider spring, and a retaining cap. The slider is seated in the fuze body at an approximate 15-degree angle.

Function. The frictional forces resulting from linear acceleration prevent movement of centrifugally actuated parts while the projectile is in the bore of the weapon. When the projectile emerges from the weapon, however, centrifugal force cause arming of the percussion plunger and slider assemblies. The centrifugal pins which hold the rotary firing pin of the plunger assembly in an unarmed position are forced out into the plunger against their springs, thereby releasing the firing pin. The firing pin is rotated outward and upward into its armed position beneath the detonator by centrifugal force. Also, centrifugal force moves the slider outward to its armed position, alining the slider charge of tetryl with the remainder of the explosive train.

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During flight, the plunger restraining springs overcome the tendency of the plunger to move forward due to creep force. They are, however, overcome by the weight of the plunger during its forward movement due to its own inertia at the moment of impact. The point of the firing pin stabs into the priming mixture which causes detonation of the lead azide and tetryl detonator charge, the slider charge of tetryl, the tetryl booster lead charge, and the booster charge of tetryl. The action is a nondelay action.

Safety features. The centrifugal pins hold the rotary firing pin in an unarmed or safe position during storage, handling, loading, and travel of the projectile through the bore of the weapon. They prevent chance shocks to the fuze during these times when driving the firing pin into the priming mixture.

The slider, prior to emergence of the projectile from the weapon, positively interrupts the flash channel between detonator and booster lead. It also carries a slider charge out of alinement with the remainder of the explosive train. It prevents prematures of the detonator prior to emergence of the projectile from the weapon from effecting the booster. It causes the fuze to be boresafe.

The plunger restraining springs prevent forward movement of the plunger due to creep force during flight. They prevent prematuring of the detonator by the firing pin during flight.

NOTE: This round is standard for issue and manufacture (S&M) and is issued to all 75-mm howitzers.

PACKING.

The present standard packing for 75-mm howitzer rounds is one round per fiber container, three rounds per bundle. They may also be found one round per fiber container, four rounds per box.

Overseas Shipment. Bundle packing must be crated in 1-bundle crates, which are stained chocolate brown and stenciled in the appropriate color marking for this type of round.

FURTHER REFERENCES: OS 9-20; OS 9-18; TM 9-1900; O.O. 7224, Ordnance Safety Manual; Complete Round Chart No. 5981; SNL R-1; SNL R-3.

Chapter 8

3-inch Ammunition

AMMUNITION FOR 3-INCH ANTI-AIRCRAFT GUNS.

General. With the rapid development, since World War I, in the

c. Description. - Externally this fuze is identical with the PDF M46 except for the marking (see fig. 30). The stampings on the body of the fuze naturally differ with types and lots. In addition, the head of the M47 fuze is black as compared with the white head of the M46. The mechanisms of the two fuzes are alike except that, for the M47 fuze, a delay element is inserted in the central channel at the rear of the body.

d. Safety features. - The safety features are identical with those of the PDF M46.

e. Action. - During flight the interrupter is actuated. On impact the percussion mechanism in the head operates in the same manner as the M46 fuze. Flame and fragments from the explosion of the upper detonator pass down the central channel and set off the delay primer. The primer in turn sets off a delay pellet, which is constructed to burn for the desired length of time (.05-sec.). The flame of the delay pellet ignites the relay pellet, which in turn sets off the lower detonator.

117. FUZE, POINT-DETONATING, M48 (figs. 31 and 32). - a. General. - This is a selective superquick-delay point-detonating fuze; that is, it may be set at will to give superquick functioning on impact or to function with .05-second delay after impact. It is of the new type with standard weight of 1.41 pounds, standard streamlined contour, and standard location of the center of gravity. Bore-safety is obtained with this fuze when used in conjunction with the M20 booster.

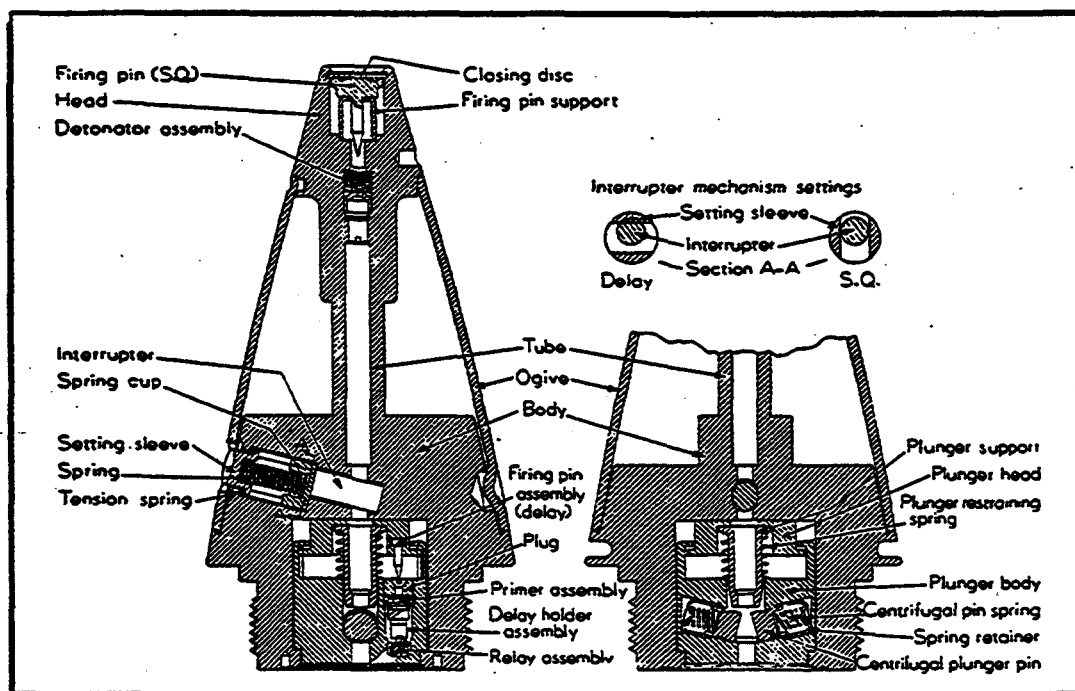


FIGURE 31. - FUZE, POINT-DETONATING, M48, (NOMENCLATURE).

the delay element, but, since the fuze is set for superquick action, the detonator of the booster functions prior to the completion of burning of the delay pellet (see fig. 32).

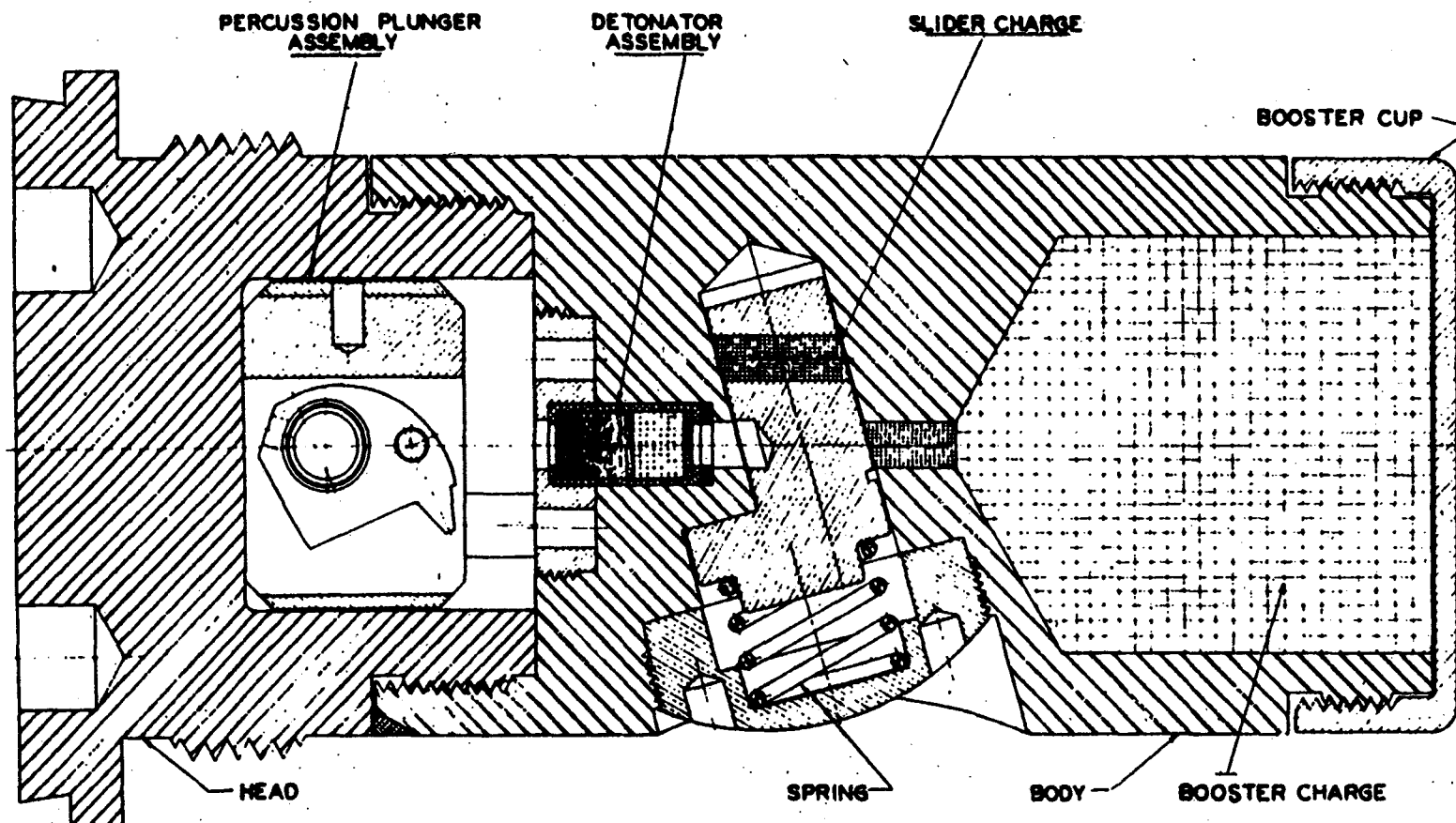
f. Delay action. - (1) This setting restrains the interrupter against outward movement in flight and, consequently, prevents the explosive wave of the superquick detonator from passing down the flash channel. On set-back, the plunger support contacts the shoulders of the centrifugal pins, thus preventing the plunger head from contacting the plunger body. Centrifugal force moves the two centrifugal pins to their outermost position, compressing the springs behind them, as soon as linear acceleration has been overcome.

(2) The delay element arms shortly after the projectile emerges from the muzzle. During flight the plunger head and plunger body are held apart by means of the restraining spring which surrounds the plunger support. On impact or retardation the plunger body is forced by inertia to move forward in the cavity of the fuze body, thus carrying the primer into contact with the delay firing pin and initiating the explosion of the delay assembly.

118. FUZE, POINT-DETONATING, M51. - a. General. - This fuze is almost identical to the M48, the difference being in the delay firing mechanism. The delay plunger assembly of the M48 will not stay in the armed position satisfactorily when fired from weapons which impart low rotational velocity to the projectile. For instance, the M48 will arm and remain armed during flight when fired from the 75-mm gun, due to high rotational velocity imparted to the projectile by the rifling in the bore. However, when fired from the 155-mm howitzer, the fuze will not remain armed due to low rotational velocity imparted to the projectile. This required a modification of the M48 to include a mechanical device to hold the delay plunger armed during flight of the projectile when fired from these larger calibered weapons. The fuze so modified was designated M51.

b. Uses. - The M51 fuze is designed for use with 155-mm and 8" ammunition. It is listed as standard for the following: shell, H.E., M101, and shell, chem., M104, for 155-mm guns; shell, H.E., M102 and shell chem., M105, for 155-mm howitzers; shell, H.E., M103, for 8" guns; and shell, H.E., M106, for 8" howitzers.

c. Function (see fig. 11). - (1) The delay element is contained in the rear of the fuze body. A plunger support and plunger restraining spring prevent the plunger body, which carries the delay element, from contacting the plunger head, which carries the delay firing pin, during transportation and firing.



RA PD 22959

Figure 175 — FUZE, B.D., M62

AMMUNITION (SEMI-FIXED) FOR 75-MM HOWITZER, M1 & M1A1

75-MM

NOTES	Designation of Howitzer	Complete Round Drg. No.	PROJECTILE										BOOSTER OR BURSTER		FUZE			CARTRIDGE CASE		PROPELLING CHARGE*		PRIMER		PACKING						Assembly No.									
			Kind	Type	Designation	Drg. No.	Wt. Loaded and Fused	Charge		Material	Forging or Casting		Designation	Drg. No.	Designation	Type	Drg. No.	Designation	Drg. No.	Nominal Weight	Kind	Size	Designation	Drg. No.	Fuse		Primer	Fiber Containing			Bundle & Accessories								
								Wt.	Kind		Drg. No.	Type													Drg. No.	Drg. No.		Drg. No.	Drg. No.			Drg. No.	Drg. No.	Drg. No.	Drg. No.	Drg. No.	Drg. No.	Drg. No.	Drg. No.
see	All	75-1-61	Shell	H.E.	M1A1	75-2-258	13.76	1.11	TNT	75-14-151	Steel	Forg	75-20-70	M20	73-2-112	M68	P.D.	73-2-110	M5A1	71-2-91	1.04	FWH	100-gr.	M1A1	74-2-32	76-7-621	76-7-623	76-8-29	76-1-160	Fused	76-1-215	1							
see	All	75-1-34	Shell	H.E.	M41	75-2-258	13.82	1.11	TNT	75-14-151	Steel	Forg	75-20-70	M20	73-2-112	M68	P.D.	73-2-110	M5	71-2-91	1.04	FWH	100-gr.	M1A1	74-2-32	76-7-621	76-7-623	76-8-29	76-1-160	Fused	76-1-215	2							
see & M	All	75-1-59	Shell	H.E.	M68	75-2-269	14.60	1.47	TNT	75-14-198	Steel	Forg	75-20-77	M20	73-2-112	M68	P.D.	73-2-110	M5A1	71-2-91	1.04	FWH	100-gr.	M1A1	74-2-32	76-7-621	76-7-623	76-8-29	76-1-266	Fused	76-1-215	3							
see & M	All	75-1-87	Shell	H.E.	M68	75-2-269	14.60	1.47	TNT	75-14-198	Steel	Forg	75-20-77	M20	73-2-112	M54	T-S.Q.	73-3-154	M5A1	71-2-91	1.04	FWH	100-gr.	M1A1	74-2-32	76-7-621	76-7-623	76-8-29	76-1-266	Fused	76-1-215	4							
see	All	75-1-92	Shell	H.E.	M1A1	75-2-258	13.76	1.11	TNT	75-14-151	Steel	Forg	75-20-70	M20	73-2-112	M54	T-S.Q.	73-3-154	M5A1	71-2-91	1.04	FWH	100-gr.	M1A1	74-2-32	76-7-621	76-7-623	76-8-29	76-1-160	Fused	76-1-215	5							
S & M	All	75-1-114	Shell	Chem	M64	75-2-294	15.25	1.34	W.F.	75-14-276	Steel	Forg	75-20-77	M84	73-1-184	M57	P.D.	73-2-138	M5A1	71-2-91	1.04	FWH	100-gr.	M1A1	74-2-32	76-7-621	76-8-29	76-1-266	Fused	76-1-215	6								
S & M	All	75-1-115	Shell	Chem	M64	75-2-294	14.94	1.04	H.S.	75-14-277	Steel	Forg	75-20-77	M84	73-1-184	M57	P.D.	73-2-138	M5A1	71-2-91	1.04	FWH	100-gr.	M1A1	74-2-32	76-7-621	76-8-29	76-1-266	Fused	76-1-215	7								
S & M	All	75-1-116	Shell	Chem	M64	75-2-294	15.12	1.51	P.S.	75-14-278	Steel	Forg	75-20-77	M84	73-1-184	M57	P.D.	73-2-138	M5A1	71-2-91	1.04	FWH	100-gr.	M1A1	74-2-32	76-7-621	76-8-29	76-1-266	Fused	76-1-215	8								
S & M	M1	72-3-59	Round	Drill	M2A2		19.2			Bronze					107M	21-sec. comb. 8		73-3-114											Complete		A								

S - Issue
 M - Manufacture
 P.D. - Point Detonating
 Chem - Chemical
 FWH - Flashless, nonhydroscopic powder
 H.E. - High explosive
 T-S.Q. - Time and superquick

8 - Burned-out fuse parts that have been condemned, or parts rejected by inspectors of the regular 21-sec. comb. or 21-sec. A.A. service fuses, may be used.
 * - 100-gr. Primer M1, M1A1, M1A1A1 may be used.
 † - Burster, Casing M6, Drg. 73-1-173.
 • - Propelling Charge Drawing 71-9-126.

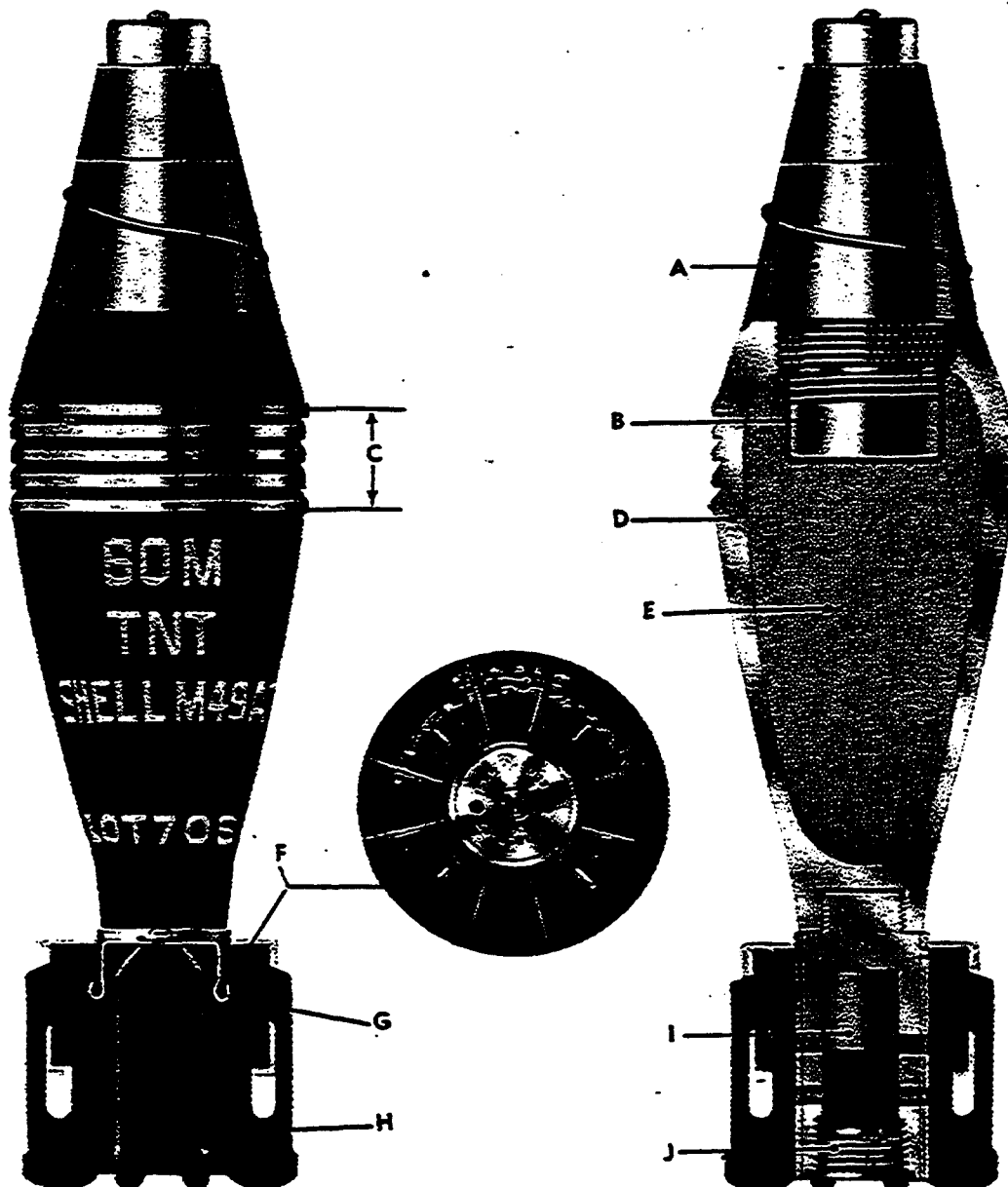
see - Some rounds on hand in fiber containers are packed in wooden boxes. See Drawing 76-1-30.
 ‡ - Packing and marking of Bundle Packing, Drg. 80-4-185.

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SHEET NO. 8

ARTILLERY AMMUNITION

- | | |
|----------------------|--------------------------|
| A — FUZE | F — PROPELLENT INCREMENT |
| B — BOOSTER | G — INCREMENT HOLDER |
| C — GAS-CHECK BAND | H — FIN ASSEMBLY |
| D — SHELL BODY | I — IGNITION CARTRIDGE |
| E — EXPLOSIVE FILLER | J — PERCUSSION PRIMER |



RA PD 80729

Figure 57 — SHELL, H.E., M49A2, w/FUZE, P.D., M52, 60-mm Mortars, M1 and M2, Complete Round

FIXED AND SEMIFIXED ROUNDS AND SEPARATE-LOADING PROJECTILES

79. SHELL, H.E., M49A2, W/FUZE, P.D., M52, 60-MM MORTARS, M1 AND M2, COMPLETE ROUND (fig. 57), is the only high-explosive round provided for the 60-mm mortars. A complete round consists of six components—the M49A2 High-explosive Shell, an M52 Fuze, a fin assembly, an M3 or M3A1 (4-increment) Propelling Charge, an M5A1 Ignition Cartridge, and an M32 Primer. All are issued and shipped assembled in a complete round which is ready for firing except for adjustment of the propelling charge. The shell body consists of a thin-walled cast or forged steel casing formed in a pear or tear-drop shape and threaded at both ends, at the narrow base end to hold the fin assembly and at the nose end to hold the M52 Fuze with its booster. The TNT shell filler is shaped at the forward end to provide a suitable well for the booster. The fin assembly consists of a 2½-inch long steel cylinder to which is welded four double-bladed fins. The hollow shaft is threaded externally at the fore end to screw into the shell base, where it is staked in position. The rear is threaded internally to hold the M32 Primer. This primer, which consists of a threaded head containing the percussion element and a short housing holding the primer mixture, is screwed into the shaft after insertion of the ignition cartridge. The M5A1 Ignition Cartridge is a cartridge paper tube approximately ⅝ inch in diameter, closed at both ends by a chipboard disk, and holding 40 grains of propelling powder. This charge provides the propelling charge for the short ranges. For the longer ranges, the increments of the M3 or M3A1 (cellophane-wrapped), Propelling Charge are provided in addition to the ignition cartridge. As shipped, each increment is inserted in one of the four spaces within the fins and held in position there by the spring clip of the increment holder. Any or all of the increments may be removed as required.

DATA

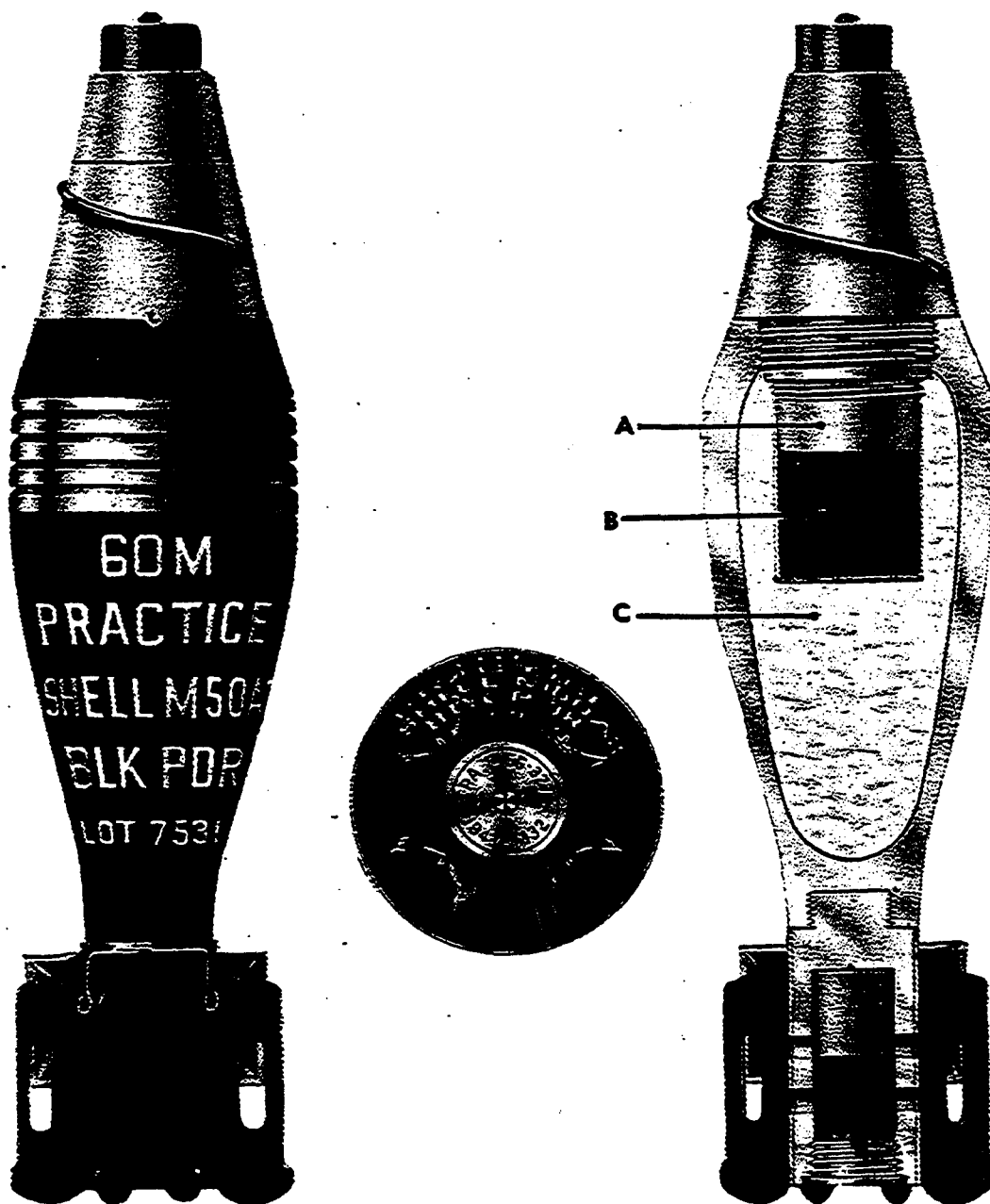
	With M52 or M52B2 Fuze	With M52B1 (Plastic) Fuze
Weight of complete round	2.96 lb	2.80 lb
Length of complete round	9.54 in.	9.54 in.
Muzzle velocity	518 ft per sec*	535 ft per sec*
Maximum range (at 45 deg).....	1,984 yd*	2,017 yd*

*—For charge 4 (cartridge plus 4 increments). Corresponding data for other charges are:

	Muzzle Velocity		Maximum Range	
	w/M52 or M52B2	w/M52B1	w/M52 or M52B2	w/M52B1
Charge 0 (Ignition Cartridge M5A1 only)	189	195	332	373
Charge 1 (Cartridge and 1 increment)	292	301	784	816
Charge 2 (Cartridge plus 2 increments) ..	377	389	1,204	1,244
Charge 3 (Cartridge plus 3 increments) ..	449	463	1,594	1,630

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- A — BOOSTER
B — BLACK POWDER
C — INERT FILLER



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Figure 59 — SHELL, Practice, M50A2, w/FUZE, P.D., M52, 60-mm
Mortars, M1 and M2, Complete Round

FIXED AND SEMIFIXED ROUNDS AND SEPARATE-LOADING PROJECTILES

81. SHELL, PRACTICE, M50A2, W/FUZE, P.D., M52, 60-MM MORTARS, M1 and M2, COMPLETE ROUND (fig. 59), is a practice round provided for the 60-mm mortars by adapting service items for this purpose. Components of the M50A2 Practice Round are the same as are used in the M49A2 Service Round except for the high-explosive shell filler. The M50A2 Projectile has a filler of inert material (plaster of paris and stearic acid) and a black powder pellet (0.05 lb) loaded adjacent to the booster of the M52 Fuze. The M52 Fuze is a superquick fuze and shell is functioned before penetration occurs. The black powder pellet and booster charge provide a spotting charge for observation purposes. The shell is loaded to the same weight as the service round, thereby providing for the same ballistic values.

DATA

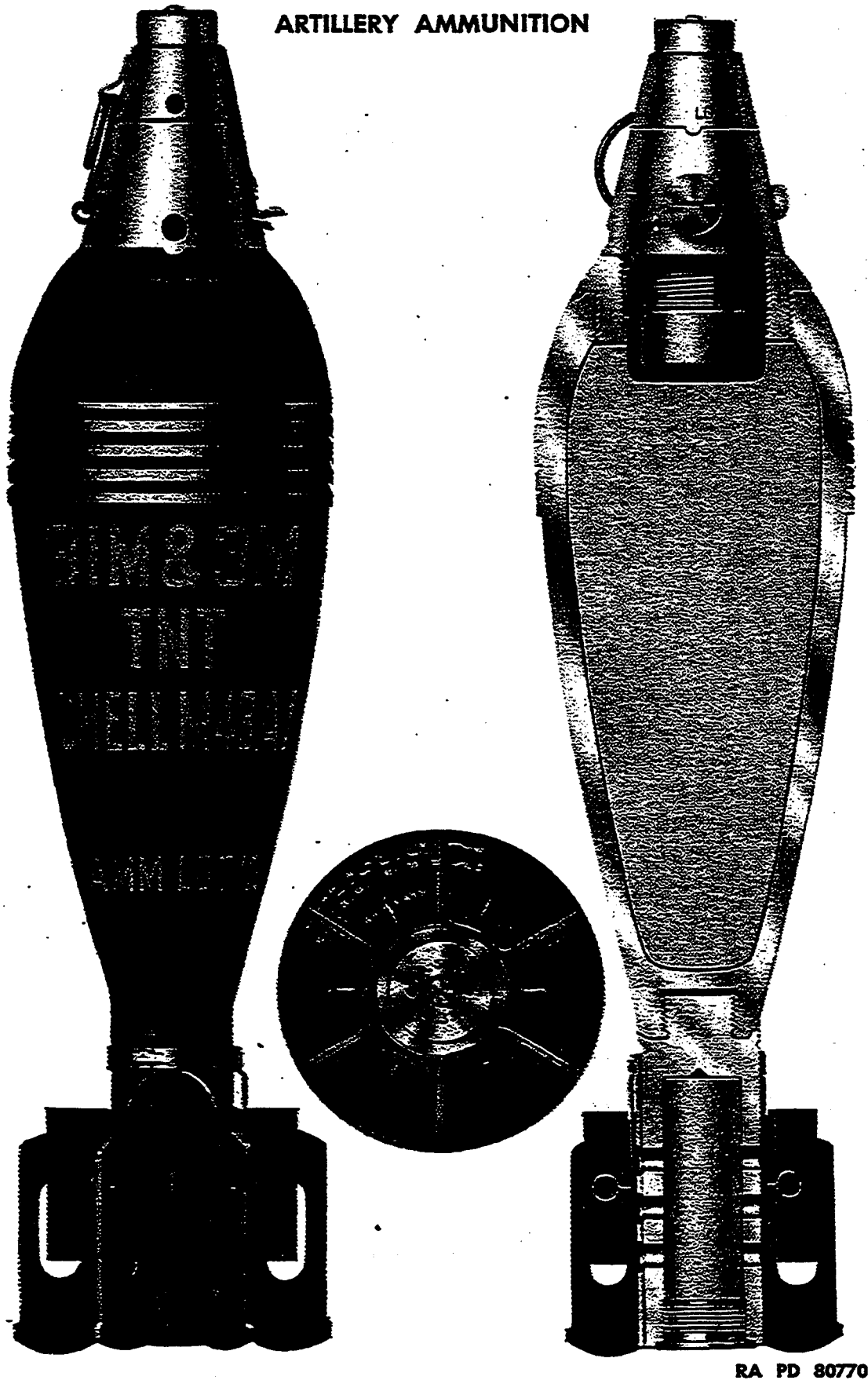
	With M52 or M52B2 Fuze	With M52B1 (Plastic) Fuze
Weight of complete round.....	2.96 lb	2.80 lb
Length of complete round.....	9.54 in.	9.54 in.
Muzzle velocity	518 ft per sec*	535 ft per sec*
Maximum range (at 45 deg).....	1,984 yd*	2,017 yd*

*—For charge 4 (cartridge plus 4 increments). Corresponding data for other charges are:

	Muzzle Velocity		Maximum Range	
	w/M52 or M52B2	w/M52B1	w/M52 or M52B2	w/M52B1
Charge 0 (Ignition Cartridge M5A1 only)	189	195	332	373
Charge 1 (Cartridge and 1 increment)....	292	301	784	816
Charge 2 (Cartridge plus 2 increments)..	377	389	1,204	1,244
Charge 3 (Cartridge plus 3 increments)..	449	463	1,594	1,630

82. SHELL, PRACTICE, M50A1, W/FUZE, P.D., M52, 60-MM MORTARS, M1 AND M2, COMPLETE ROUND, is limited standard for practice purposes, having been superseded by the M50A2 Round. The shell is basically the same as the current standard but contains a somewhat smaller black powder pellet (0.04 lb). Other differences are in respect to the ignition cartridge and manner of assembling the M3 Propellant Charge to the fin. The fin assembly is adapted for the M4 Cartridge which includes the primer. The propelling charge increments are held in position on the fin by inserting two corners of the bundles in the slots in the blades.

ARTILLERY AMMUNITION



RA PD 80770

Figure 99 — SHELL, H.E., M43A1, w/FUZE, P.D., M52, 81-mm Mortar, Complete Round

FIXED AND SEMIFIXED ROUNDS AND SEPARATE-LOADING PROJECTILES

180. SHELL, H.E., M43A1, W/FUZE, P.D., M52, 81-MM MORTAR, COMPLETE ROUND (fig. 99), is a light-weight round provided for fragmentation and blast effect. The complete round is made up of six components: the M43A1 Shell, an M52 Superquick Fuze, a fin assembly, an M1 Propellant Charge, an M6 Ignition Cartridge, and an M33 Percussion Primer. The shell consists of a thin-walled egg-shaped steel casing holding a 1.23-pound high-explosive charge. The shell casing is cut and threaded at the nose end to fit an adapter into which the M52 Fuze with its booster is screwed after the shell is loaded, the bursting charge being shaped at the free end to provide a suitable well for the booster. The base of the shell is drilled and threaded to hold the fin assembly. The fin assembly consists of three double-bladed fins welded to a cylindrical shaft. The shaft is drilled and threaded internally at the rear to hold the igniter cartridge and the primer, the latter holding the cartridge in position. The shaft is threaded at the front end to screw into the base of the shell. Vents in the shaft provide for transmission of the cartridge flash to the propellant increments and facilitate burning and disintegration of the cartridge and case. The propellant increments are pushed into the spaces between the fin blades and held there by a spring clip arrangement which permits easy removal as desired. The M43A1 Round may be adapted for the 3-inch trench mortar by reducing the outer zone propelling charge from six to four increments. With the M52 Fuze, the shell functions with superquick action and before any appreciable penetration of the target.

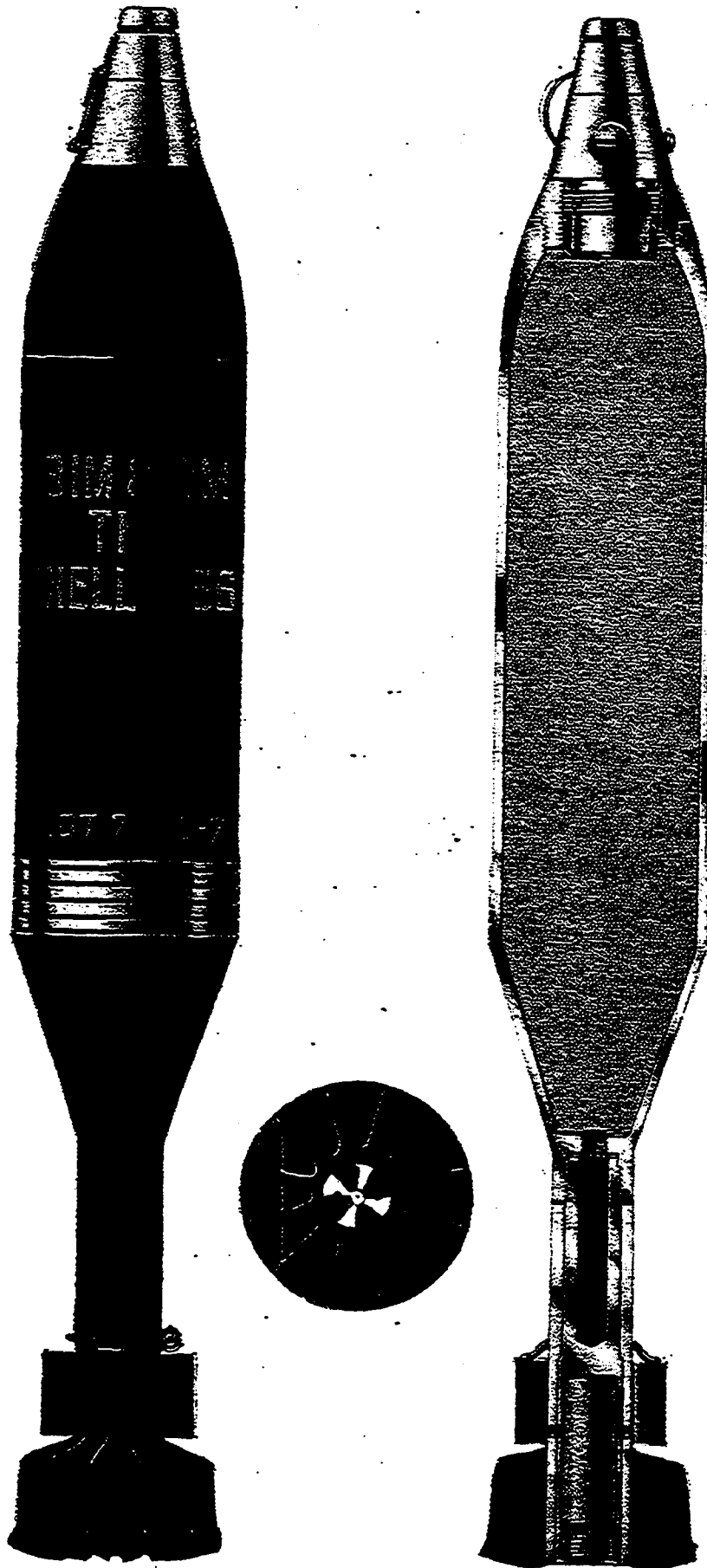
DATA

Weight of complete round.....	7.10 lb	Length of projectile, w/fin....	13.27 in.
Length of complete round.....	13.27 in.	Muzzle velocity	700 ft per sec*
Maximum range		3,290 yd*	

*—For six increments (full charge). Corresponding data for other charges are:

	Muzzle Velocity (ft per sec)	Maximum Range (yd)
Charge 0 (ignition cartridge only)	235	541
Charge 1 (ignition cartridge plus one increment)	332	1,020
Charge 2 (ignition cartridge plus two increments)	419	1,502
Charge 3 (ignition cartridge plus three increments)	449	2,042
Charge 4 (ignition cartridge plus four increments)	572	2,517
Charge 5 (ignition cartridge plus five increments)	638	2,963

ARTILLERY AMMUNITION



RA PD 80771

Figure 100 — SHELL, H.E., M56, w/FUZE, P.D., M53, 81-mm Mortar, Complete Round

FIXED AND SEMIFIXED ROUNDS AND SEPARATE-LOADING PROJECTILES

181. SHELL, H.E., M56, W/FUZE, P.D., M53, 81-MM MORTAR, COMPLETE ROUND (fig. 100), is the heavy type of the two current standard rounds for fragmentation and blast effect. The complete round consists of six components: the M56 Shell, an M53 Short-delay Fuze, a fin assembly, an M2 Propelling Charge, an M6 Ignition Cartridge, and an M34 Percussion Primer. Rounds of future manufacture will also be assembled with FUZE, TSQ, M77. Until the M77 Fuze is available, the FUZE, P.D., M52, will be issued. The projectile is made up of a 4.3-pound high-explosive charge (TNT or an alternative) held in a thin-walled shell made of steel tubing. The shell casing is formed to a long cylindrical shape with a long tapered (boat-tailed) base and a short ogival nose. The nose is threaded to hold an adapter into which the fuze with its booster is screwed and staked after the shell is loaded. The tapered base is drilled and threaded to hold the fin assembly. The fin assembly is an aluminum alloy die casting with 12 blades seated on a hollow cylindrical shaft. The shaft acts as a sleeve for a steel liner which is threaded at the front end to screw into the shell base. The rear of the liner is hollow and holds the ignition cartridge and primer, the latter screwing in and holding the cartridge in position. The shaft is vented to permit transmission of the ignition of the flash cartridge to the propelling increments. The M2 Propelling Charge comprises four increments or bundles of propelling powder in the form of square flakes or sheets. The flakes have a hole through the center and a slit from center to edge to permit seating on, and removal from, the fin shaft. The increments are held against the front edges of the fin blades by a spring clip arrangement. See figure 98 for method of shipping M2 Increments. The M2A1 Increments (cellophane-wrapped) are held flat around the fin shaft by means of the Holder M3. The M56 Round may be adapted for firing from the 3-inch trench mortar by reducing the outer zone propelling charge from four to three increments.

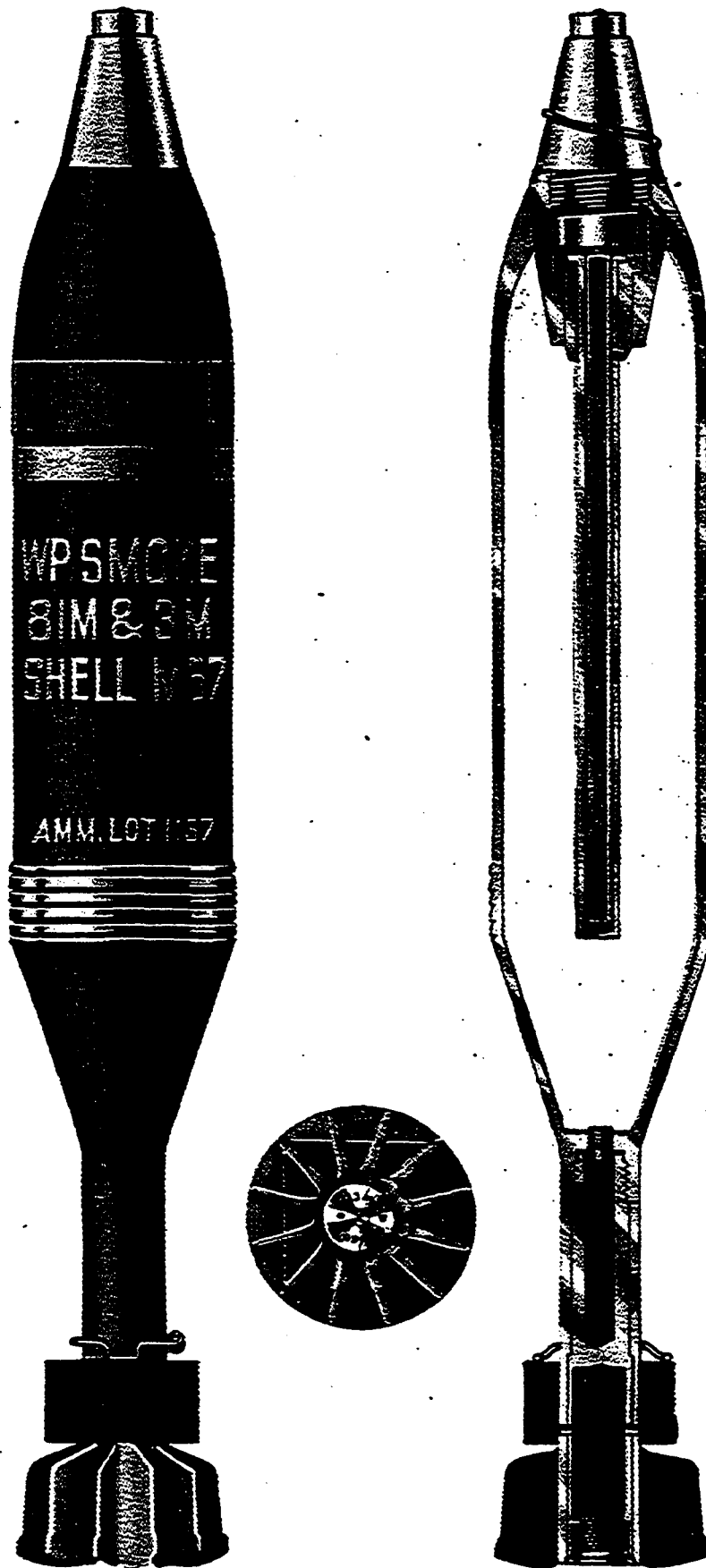
DATA

Weight of complete round.....	10.82 lb	Length of projectile, w/fin....	22.89 in.
Length of complete round.....	22.89 in.	Muzzle velocity	583 ft per sec*
	Maximum range		2,560 yd*

*—For four increments (full charge). Corresponding data for other charges are:

	Muzzle Velocity (ft per sec)	Maximum Range (yd)
Charge 1	306	875
Charge 2	412	1,474
Charge 3	502	2,046

ARTILLERY AMMUNITION



RA PD 80772

Figure 101 — SHELL, Smoke, Phosphorus, WP, M57, w/FUZE, P.D., M52, 81-mm Mortar, Complete Round

FIXED AND SEMIFIXED ROUNDS AND SEPARATE-LOADING PROJECTILES

182. SHELL, SMOKE, PHOSPHORUS, WP, M57, W/FUZE, P.D., M52, 81-MM MORTAR, COMPLETE ROUND (fig. 101), is assembled from the same components as are used with the M56 High-explosive Round (par. 181) but is loaded with a phosphorus filler for screening purposes. To adapt the M57 Shell for this filler, the nose of the shell casing is fitted with a special adapter. This serves to provide the tight seal necessary with chemical loading and also acts as the seat for the burster assembly. The burster consists of a thin-walled tubing filled with a small charge of tetryl. This assembly extends from the nose longitudinally through the chemical filler for about three-quarters the length of the cavity. Its function is to burst the shell casing and scatter the chemical contents. The superquick type of fuze is fitted to the shell to provide for burst before penetration. White phosphorus burns with a dense smoke and has an incendiary effect. For firing the 3-inch trench mortar, the maximum charge is reduced from four to three increments.

DATA

Weight of complete round.... 11.61 lb* Length of projectile, w/fin.... 22.89 in.
 Length of complete round..... 22.89 in. Muzzle velocity 560 ft per sec
 Maximum range..... 2,466 yd†

*—Weight with M52B2 Fuze (plastic head) is 11.57 pounds.

†—For four increments (full charge). Corresponding data for other charges are:

	Muzzle Velocity (ft per sec)	Maximum Range (yd)
Charge 1	297	833
Charge 2	399	1,409
Charge 3	484	1,952

183. SHELL, SMOKE, FS, M57, W/FUZE, P.D., M52, 81-MM MORTAR, COMPLETE ROUND, is assembled from the same components as are used with the M56 High-explosive Round (par. 181), but is loaded with FS, a liquid smoke-producer which functions very much like white phosphorus, but lacks the incendiary effect. It differs from that described in paragraph 182 only with respect to the kind of chemical filler.

DATA

Weight of complete round.... 12.11 lb* Length of projectile, w/fin.... 22.89 in.
 Length of complete round..... 22.89 in. Muzzle velocity 544 ft per sec†
 Maximum range 2,431 yd†

*—Weight with M52B2 Fuze (plastic head) is 12.07 pounds.

†—For four increments (full charge). Corresponding data for other charges are:

	Muzzle Velocity (ft per sec)	Maximum Range (yd)
Charge 1	291	808
Charge 2	390	1,374
Charge 3	472	1,916

ARTILLERY AMMUNITION



RA PD 80774

Figure 102 — SHELL, H.E., M45B1, w/FUZE, P.D., M53, 81-mm Mortar, Complete Round

184. SHELL, H.E., M45B1, W/FUZE, P.D., M53, 81-MM MORTAR, COMPLETE ROUND (fig. 102), is an earlier design which is no longer being manufactured. The round is essentially the same as the current standard rounds and intended for the same purposes. However, the M45B1 Shell is longer and heavier than the shell now being manufactured but contains less explosive in relation to the total weight of the loaded shell. The fin assembly consists of a short shaft with four supports to which are spring-hinged four slightly arched leaves. These are held in a closed position by shear pins prior to firing, and are released and open to form stabilizing vanes during flight. In the closed position, the leaves provide a shallow cup-like seat for the propelling charge. The charge used consists of loose powder grains held on a celluloid container. Four of these comprise a full charge. The M3 Ignition Cartridge, which includes the primer, is assembled to this round, being seated as in other rounds, in a hole in the shaft beneath the fin. The shaft is vented to permit the flash from the cartridge to reach the propellant increments. The short-delay type of fuze is used with this round. This ammunition can be fired from the 3-inch trench mortar, without adjustments.

DATA

Weight of complete round.....	15.15 lb	Length of projectile, w/fin....	23.62 in.
Length of complete round.....	23.62 in.	Muzzle velocity	380 ft per sec*
Maximum range		1,275 yd*	

*—For four increments (full charge). Corresponding data for other charges are:

	Muzzle Velocity (ft per sec)	Maximum Range (yd)
Charge 1	216	446
Charge 2	276	715
Charge 3	330	986

185. SHELL, H.E., M45, W/FUZE, P.D., M45, 81-MM MORTAR, COMPLETE ROUND, differs principally from the M45B1, described in paragraph 184, with respect to the fuze. FUZE, P.D., M45, is a selective type providing for superquick or short-delay (0.1-sec) functioning. Because of the difference in the fuze, the complete round weighs slightly less than the M45B1 (15.10 lb), and is slightly shorter (23.59 in.).

FIXED AND SEMIFIXED ROUNDS AND SEPARATE-LOADING PROJECTILES



RA PD 80776

Figure 103 — SHELL, Practice, M44, w/FUZE, P.D., M52, 81-mm Mortar, Complete Round

186. SHELL, PRACTICE, M44, W/FUZE, P.D., M52, 81-MM MORTAR, COMPLETE ROUND (fig. 103), simulates the M43A1 High-explosive Round for use in practice. When loaded and fuze, the cast-iron projectile weighs the same as the service shell. However, the shell loading consists of 0.2 pound of black powder together with sufficient inert material to give the required shell weight. Since ballistic and other characteristics are the same as for the M43A1 Service Round, data given in paragraph 180 also are applicable to the M44 Round.



RA PD 80775

Figure 104 — SHELL, Practice, M43A1, w/FUZE, P.D., M52, 81-mm Mortar, Complete Round

187. SHELL, PRACTICE, M43A1, W/FUZE, P.D., M52, 81-MM MORTAR, COMPLETE ROUND (fig. 104), is an alternative practice round to the M44. It is an adaptation of the M43A1 Service Round (par. 180) for practice purposes, accomplished by changing the shell filler. All other components are the same as for the service round, and construction and assembly of these in the round are the same. For practice purposes, the shell cavity is filled with an inert material (plaster of paris and stearic acid) except for a 0.06-pound black powder pellet. The black powder is loaded at the front end of the cavity, adjacent to the rear wall of the booster casing when the fuze is assembled to the shell. The fuze booster and black powder pellet provide a spotting charge for observation of fire. Ballistic properties are the same as for the M43A1 Service Round and data given in paragraph 180 are applicable to the practice round.

AMMUNITION FOR 60 MM MORTARS M1 AND M2

60-MM

NOTES	Designation of Mortar	Complete Round Drg. No.	PROJECTILES										FUZE			PROPELLING CHARGE *	PRIMER		IGNITION CARTRIDGE *			PACKING **			Assembly No.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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P.D. - Point detonating
H.E. - High explosive
TNT - Trinitrotoluene
B.P. - Black Powder

- * - Full charge = 4 increments of sheet powder; weight of one increment = 55 grains.
- † - See Drg. 75-2-288 for other methods of manufacture and Drg. 75-20-85 for casting.
- ** - For Bundle Accessories see Drg. 75-1-295.
- *** - 6-Rounds per Container, for individual container see Drg. 75-1-293.
- § - Some ammunition is on hand assembled with ignition cartridge M4, Drg. 75-19-77.

Issued - January 1, 1940.

Revised - August 9, 1941.

SHEET NO. 5

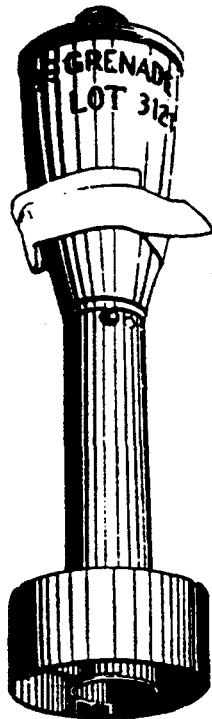
AMMUNITION INSPECTION GUIDE

GRENADE, Rifle, H.E., M9. This is the originally developed antitank grenade, and is now standard for issue only since an improved type has been developed. It has a sheet metal body and weighs 1.5 pounds. It will detonate upon impact, provided the surface struck and the angle of impact are such as to exert pressure on the projection on the nose of the grenade (fig. 99).

GRENADE, AT, M9A1. This grenade also has a sheet metal body, but weighs only 1.31 pounds. It is more sensitive than the M9 and may detonate upon impact with soft earth. However, for certainty of detonation, it should strike the target head-on, or nearly so. The grenade consists of two principal parts: the high explosive head, and the stabilizer tube and fin assembly (fig. 99). The head of the grenade is composed of the ogive, or forward rounded portion; and the body, or rear portion to which the ogive is crimped. The charge of the grenade is 50/50 cast pentolite with the exception of a 10/90 cast pentolite booster surround.

This type of charge is known by the name "shaped charged." The effect of such a shaped charge on armor plate is very unusual. It appears to focus the detonating wave against a small area of the plate. This focused and concentrated wave hits the plate with such terrific force that a roughly cylindrical hole is driven through it. The metal of the plate is raised to an incandescent heat and issues from the rear of the hole in the armor in the form of a cone-shaped spray whose angle of opening is approximately 90 degrees. This effect of the shaped charge is also known as the "Munroe effect," receiving this

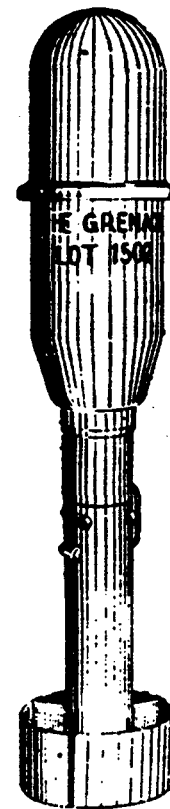
SMALL ARMS AND TRENCH WARFARE



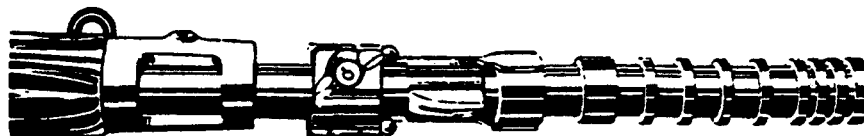
GRENADE, AT, M9.



CARTRIDGE,
AT, GRENADE, M3



GRENADE, AT, M9A1.



LAUNCHER, GRENADE, M1.

RA PD 15196

Figure 99 — Rifle Grenades and Launcher

Classes of Ammunition

h. The boxes containing practice mines are painted with a blue band around the center of each box and blue cleats on the ends of each box. Wooden boxes of high-explosive mines are stained light brown with marking in yellow, or, more recently, unstained with marking in black. Metal boxes are painted olive drab.

153. ANTIPERSONNEL MINES.

a. **Purpose.** Issued antipersonnel mines are standardized mechanisms intended for effect against personnel.

b. **"Bounding" antipersonnel mine.** This mine, when functioned, throws a projectile upward to a height of 4 to 6 feet. It has an effective radius of about 30 feet. The complete assembly weighs approximately 5 pounds. The mine has the appearance of a small mortar with an attached firing device (fig. 141). The projectile is thrown into the air by the burning of small propelling charge of black powder in the base of the mine. The mine is painted olive drab on which the markings are in black; the base is painted yellow.

c. **Cast-iron fragmentation mine.** This type of antipersonnel mine resembles a brick (fig. 142). It is approximately 5½ inches high and 3½ inches square. There are three threaded wells in the mine body, one in each of two sides and one in the end, to accommodate standard Corps of Engineers firing devices (fuzes). A relatively heavy charge of TNT and thick walls produce fragmentation and blast effect. When used above the ground, the bursting radius of this mine is greater than that of the bounding type mine. It is painted olive drab with markings in black.

d. **Practice antipersonnel mine.** The practice antipersonnel mine (fig. 143) simulates the "bounding" type antipersonnel mine. The metal parts are the same as those used for the service mine, except for the projectile which is made of cardboard and the igniter which contains a delay element to provide for a delayed functioning of the mine four seconds after functioning of the fuze. The projectile contains a spotting charge assembly which resembles a shotgun shell with a delay element in place of the primer. In order that the mine may be used several times, the following replacement parts are issued:

Primer and igniter assembly.

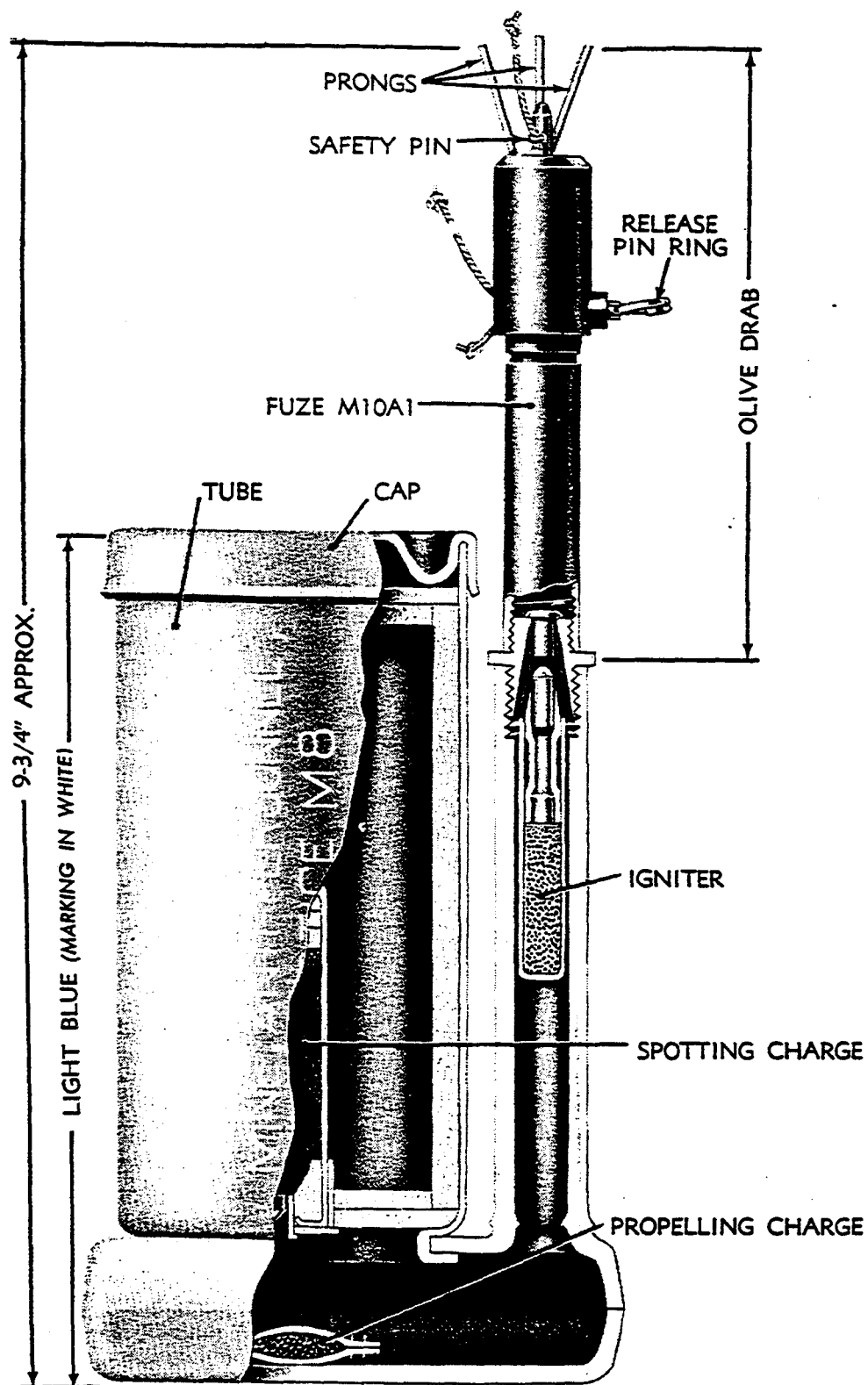
Cap (cover).

Projectile.

Spotting charge.

Propelling charge.

e. **Packing and marking.** The "bounding" antipersonnel mine is packed complete with a firing device and a spool of steel wire in a corrugated paper jacket. Ten such containers are packed into a

Classes of Ammunition

RA PD 89372

Figure 143 — Practice Antipersonnel Mine M8, With M10A1 Fuze

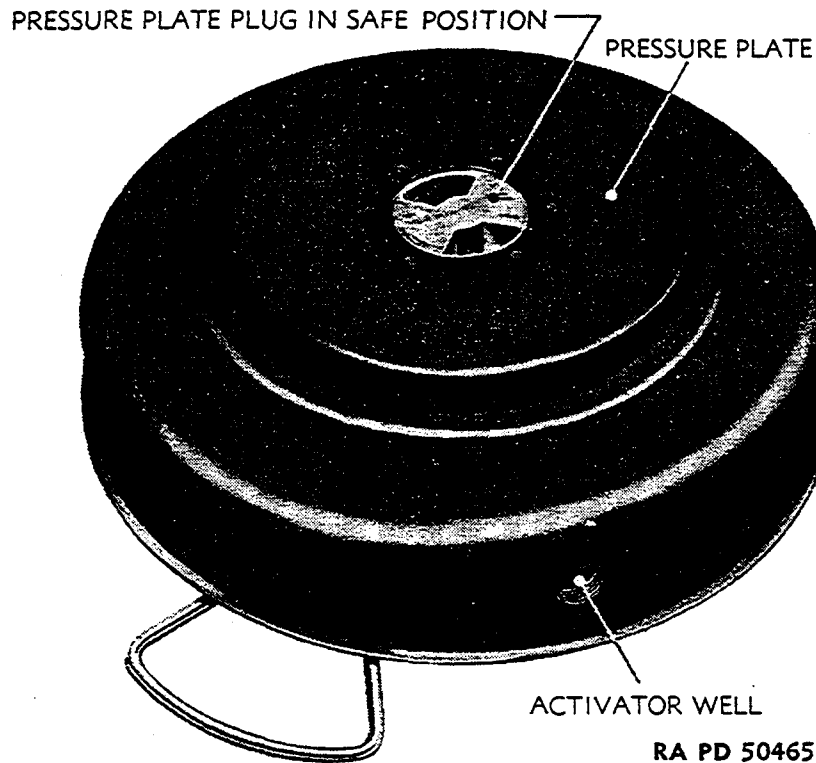
Classes of Ammunition

Figure 137 – Heavy Antitank Mine M6

lifting device for exploding the mine upon pick-up. There is no spider on the nonmetallic mine as pressure on any part of the top of the mine body will cause the fuze to function. A force of approximately 300 pounds on the pressure plate is required to cause the fuze to function.

151. ANTITANK PRACTICE MINES.

a. **Metallic antitank practice mine.** The practice metallic mine M1 has a base diameter of approximately $8\frac{3}{4}$ inches and a maximum height of $4\frac{1}{4}$ inches. It is similar to the high-explosive mine but upon activation releases only a puff of white smoke. Some lots of this mine have the filling plug in the top of the mine. The complete round consists of three components; an empty mine body (which has five 1-inch holes equally spaced around the side), the spider, and the fuze. Practice fuzes have the striker head painted red. The mine has the same weight and functions in the same manner as the high-explosive mine and is used for training. It is cheap to manufacture and is not dangerous. The M1B1 is a practice metallic mine and resembles the service mine except that the filling hole is in the bottom of the mine body and that all parts are manufactured by stamping. It is approximately $8\frac{1}{4}$ inches in diameter and $3\frac{1}{2}$ inches high. This mine is sand-filled to weight before it is issued for use in practice.

SMALL ARMS AND TRENCH WARFARE

which is separated from the ceramic parts by perforated asphalt cushions. This protective outer covering is held in place by nonstretch adhesive tape which allows compression action only. An activator well, in the base of the mine, accommodates engineer firing devices.

The fuze, as well as the body, has no metal parts other than a metal safety key which must be removed in order that the fuze can be inserted in the mine, and a metal safety ring which must be removed to arm the mine. The plastic fuze body contains a plastic firing pin which, under pressure, breaks an acid ampule. The acid sets off a priming mixture, which in turn causes detonation of a detonator, a tetryl booster, and the bursting charge of TNT.

This mine has two advantages over previous types:

1. It is nonmetallic and therefore not detectable by the detectors in use at the present time.
2. Due to its shock absorber ring, it is very insensitive to sympathetic detonation and therefore is resistant to attempts to clear paths through the mine fields with devices such as bangalore torpedoes.

MINE, ANTITANK, PRACTICE, M1, WITH FUZE, MINE ANTI-TANK, PRACTICE, M1.

The body of this mine is similar to that of the H.E. mine, differing only in that it is empty (no bursting charge). Also, it is provided with a cast iron former as a support to prevent crushing of the body. It has no filling hole. Five, equally spaced, 1-inch diameter holes may be found in the side of the mine body.

The FUZE, mine, antitank, practice, M1, is similar to the M1 H.E. Fuze except that a cal. .32 blank cartridge replaces the detonator and a smoke-puff charge of black powder and red phosphorus replaces the booster.

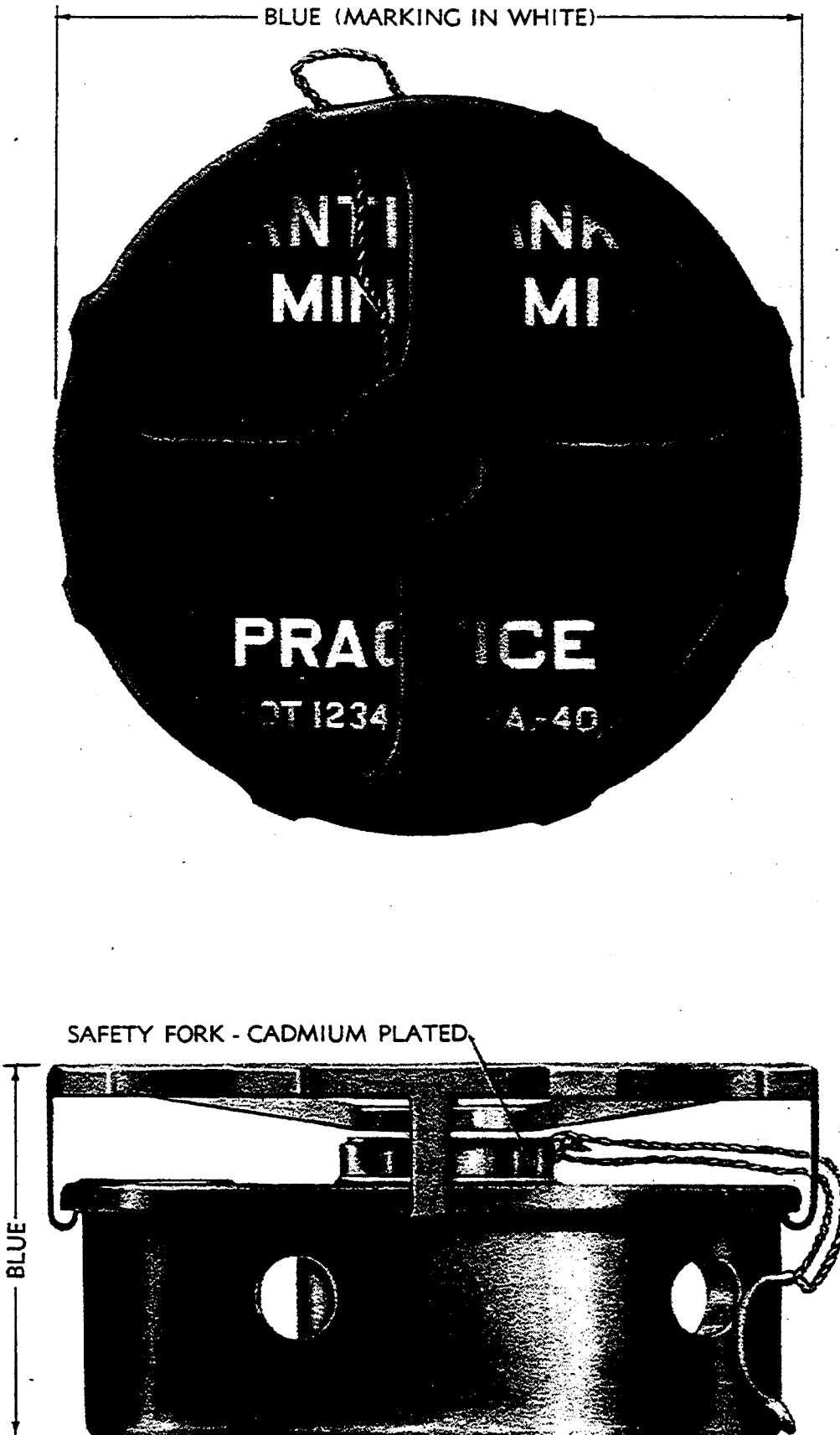
A FUZE, dummy (antitank mine), M1, is also provided. It is a plastic simulation of the service fuze and is provided with a removable safety fork. As its name indicates it is completely inert.

This mine can be used more than once by the provision of new fuzes and, when necessary, the replacement of bent or broken spiders.

MINE, ANTITANK, PRACTICE, M1B1.

This mine body differs from the previous mine body in that it may be sand-loaded to weight. A filling hole and filling hole cap are provided. Also, the body is without holes in the side. The cast iron former is of smaller diameter and is located centrally within the body. Four slotted openings are formed between it and the fuze cavity in the top of the mine body. The same fuzes as in the previous round are used with this practice mine.

AMMUNITION INSPECTION GUIDE



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Figure 105 — MINE, Antitank, Practice, M1
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CHAPTER 2—2.36' ROCKETS

SECTION I

RESTRICTED

ROCKET, H.E., AT, 2.36', M6A1

10 GENERAL

a. Description.— The antitank rocket, 2.36", M6A1, is both an offensive and defensive weapon. In both types of action, it is used primarily to fire upon hostile armored vehicles which come within effective range. It is essentially a weapon of opportunity. It is 21.6" long and weighs 3.5 lb. It has a relatively low rate of fire and a distinctive flash discharge. Its muzzle velocity is approximately 265 ft./sec. The maximum range is 700 yd., but the rocket is comparatively inaccurate at ranges over 300 yd. In the hands of trained personnel, it is a powerful supporting weapon at short ranges with limited fields of fire. It is highly effective against all known types of medium tanks.

b. Tactical use.— (1) Offensive action.— Being both highly mobile and effective against pill-box and mechanized defenses, the antitank rocket, 2.36", M6A1, is a valuable weapon to be carried by landing forces, raiding groups, tank-hunting parties, and motorized reconnaissance units. It is capable of delivering harassing fire against an area target from ranges as great as 600 yd. and so is extremely valuable in attacks on vehicular bivouacs and halted or disabled armored vehicles and for use in ambushes.

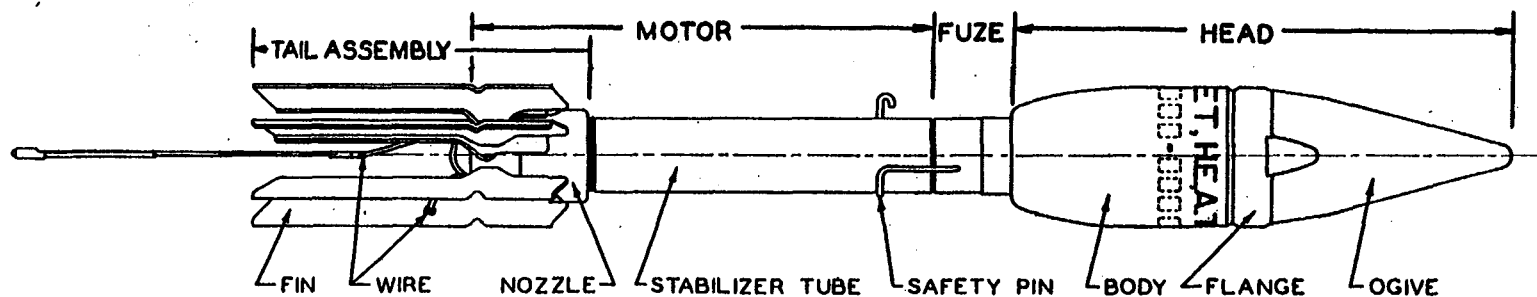
(2) Defensive action.— The foremost use of this weapon is that of a defensive weapon against the attack of mechanized forces. It should always be conserved for this emergency purpose. Whenever time permits, rocket teams will be assigned a definite place in the antimechanized defense of a weapon, unit, or installation; and if natural cover is not available, two-man-type fox holes will be dug for each rocket team. In the event of a surprise

attack, rocketeers must maneuver themselves in the most favorable position to direct their fire against the nearest hostile vehicle. The antitank rocket is valuable in the following defensive situations: the close-in defense of crew-served weapons; the protection of motorized columns on the march and at temporary halts; the protection of minefields, wire entanglements, observation and command posts; and the defense of all rear-area installations of all arms and services within the range of hostile mechanized forces.

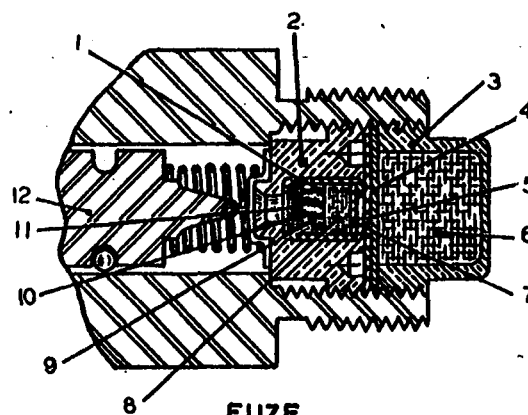
(3) Miscellaneous.— In addition to the above uses as an antitank projectile; this rocket can also be used in a stationary emplacement for demolition or as an antitank mine or a booby trap.

c. Effect.— (1) The rocket will penetrate 3" of homogeneous-steel armor plate at all ranges and at angles of impact as low as 30°. The force of the detonation is so great that the metal of the armor plate is raised to a state of incandescence and heated particles of the metal fly from the back of the plate in a cone-shaped spray. This spray has antipersonnel effect as far as 30 yd. and usually causes any ammunition which it strikes to detonate.

(2) Against masonry and structural steel, the rocket has a powerful blast and shattering effect. It will penetrate up to 9" of pine timber, but its continuing spray is not as effective as in the penetration of armor plate. Ground impact will not ordinarily cause detonation at high angles of impact. At low angles of impact, the blast effect is similar to that of the 75-mm high-explosive shell. Impact against water will never cause detonation.



- 1-DETONATOR CUP
- 2-DETONATOR HOLDER
- 3-BOOSTER CUP
- 4-DISK
- 5-DETONATOR-HOLDER RETAINING DISK
- 6-BOOSTER CHARGE



- 7-COLORED DETONATOR CLOSING DISK
- 8-DETONATOR PELLET
- 9-INTERMEDIATE DETONATOR CHARGE
- 10-UPPER DETONATOR CHARGE
- 11-DETONATOR DISK
- 12-FIRING PIN

ROCKET, H.E., AT, M6A1
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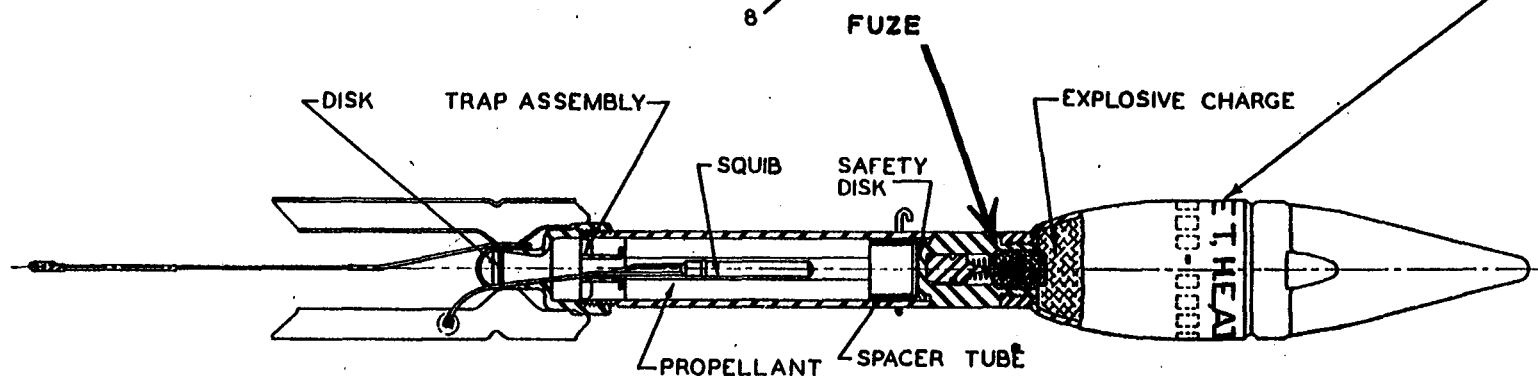


FIGURE 6. - ROCKET, H.E., AT, 2.36", M6A1

RESTRICTED

11 ROCKET LAUNCHER, M1A1

a. General.— The 2.36" antitank rocket launcher, M1A1, is an electrically operated weapon of the open-tube type. It is fired from the shoulder in the standing, kneeling, sitting, or prone positions. The tube has a smooth bore and is approximately 54.5" long. It is 2.37" in internal diameter and weighs 13.26 lb.

b. Description.— (1) Attached to the left side of the barrel are the front and rear sights. The rear sight is a peep sight; the front sight consists of three studs for ranges of 100, 200, and 300 yd. Intermediate or greater ranges, lead, and windage must be estimated by the firer.

(2) Ahead of the front sight and secured to the tube by a screw and nut is a flash deflector of conical wire screen with a mounting clamp which overlaps the muzzle end of the launcher. The flash deflector deflects particles of unburned powder which might fly back in the face of the firer.

(3) The hand grip consists of the left and right trigger grips attached to the trigger support. The trigger support accommodates the trigger guard, trigger, and the lower and upper trigger-switch contacts. The trigger is pinned at its upper end to the trigger support and is free to pivot.

(4) The stock has a narrow vertical slot by means of which it slips over the stock support, to which it is attached by screws. In the bottom of the stock there are two vertical cylindrical compartments for accommodating four batteries. The two batteries in the rear compartment are in actual use; the two batteries in the front compartment are spares. Eveready 791-A batteries are issued initially. When replacement is necessary, two separate cells of the battery BA-42 type can be used if the Eveready batteries are not available. The batteries are kept in position by a hasp assembly which fits on the bottom of the stock and is kept closed by a spring-actuated hasp catch which engages the stock pin.

(5) On the left side of the stock is a small electric lamp for testing the electric circuit and battery. The lamp is connected parallel with the firing mechanism, and it lights when the trigger is squeezed, regardless of whether the rocket is in the launcher or not. A spare lamp is carried in a circular compartment on the right side of the stock, under the circuit indicator cover.

(6) The face guard, pressed on the barrel above the stock and held in position by its own tension, protects the firer's face from the heat in the tube.

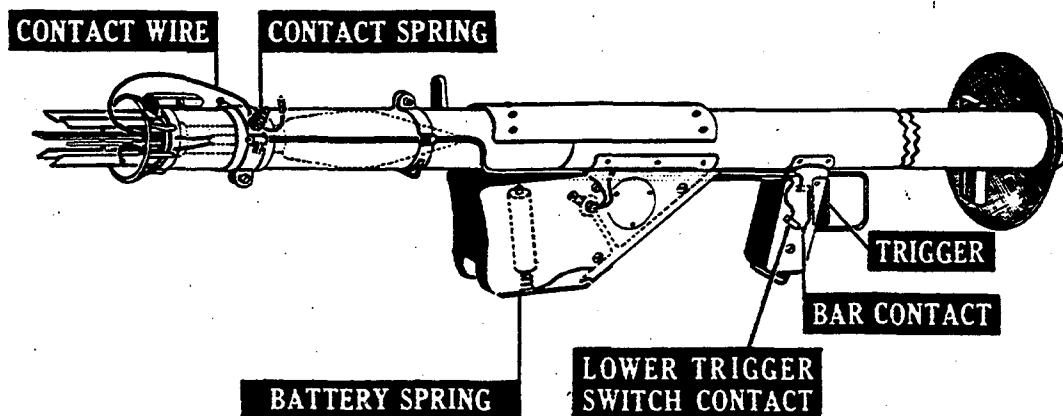


FIGURE 7. - ROCKET LAUNCHER, M1A1 RESTRICTED

M6A1 ROCKET

(7) At the rear of the barrel is a spring-actuated tail-latch assembly. The function of the latch is to engage notches on the tail of the rocket and hold it in position for firing. The breech guard at the breech end of the barrel facilitates loading of the rocket, protects the tail-latch assembly, prevents distortion of the end of the barrel, and prevents entry of dirt and foreign material when the end of the launcher rests on the ground.

c. Electrical functioning (see fig. 7).— (1) When the trigger is squeezed, it presses the bar contact against the lower trigger-switch contact to complete the electric circuit.

(2) The battery spring in the base of the stock contacts the batteries and is connected by wire to the stock support to complete the electric circuit. From the rear of the stock to the insulated contact springs, the barrel is wound with bracing wire. The two contact springs, one on each side of the tube, serve as connecting points for the contact wire leading from the rocket. In this manner, the circuit is completed. The electric current passes through the rocket and sets off an electric igniter which ignites the propelling charge.

(3) When the pressure on the trigger is released, the trigger spring forces the trigger to the forward position and the electric circuit is broken.

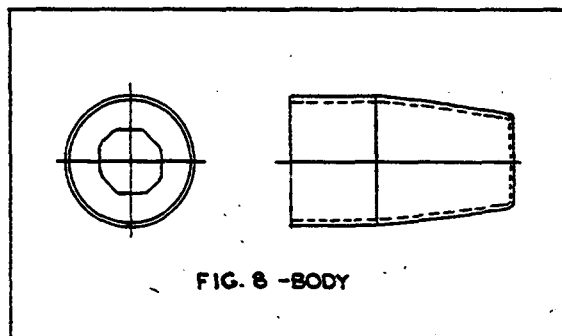
12 ROCKET COMPONENTS

The M6A1 rocket is 21.62" long and consists of a body and ogive assembly, complete with explosive components, and a stabilizer and fuze assembly, complete with explosive and propellant components. The total weight of the rocket is divided between these two component assemblies, the former weighing 1.57 lb., the latter, 1.82 lb. In the following paragraphs each component will be described. The explosive components will be discussed separately.

13 BODY AND OGIVE ASSEMBLY

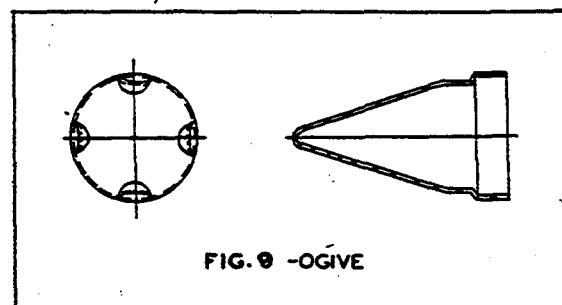
This assembly (see fig. 6) comprises the head of the rocket. Taken by itself, it has the general appearance of a boattailed artillery projectile. It consists of a body, ogive, and body union.

a. Body.— This (see fig. 8) is a steel cup, 4.11" long, with a diameter of 2.23" at its forward open end and



with walls 0.087" thick. The rear half of the body is slightly tapered, and in the rear face is punched a hexagonal hole, 1.06" across the flats. Into this hole is fitted the body union. An external longitudinal groove, 0.175" wide and 0.037" deep, is pressed 0.385" to the rear of the forward end of the body.

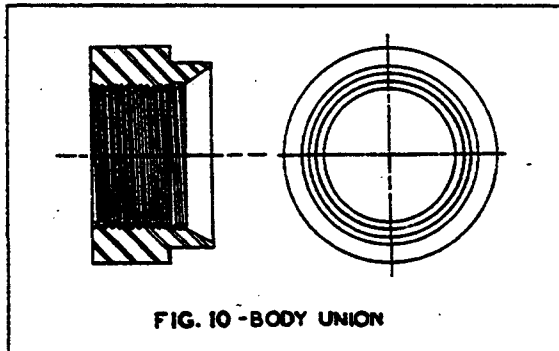
b. Ogive.— The ogive (see fig. 9) is a cone, 4-1/2" in height and 2.245" in diameter. The walls of the cone are 0.031" thick and are bulged out to form a flange approximately 1/2" wide at the base. This flange fits over the open end of the body and acts as the forward bearing surface of the rocket in its travel through the launcher. The flange is clinched securely into



the groove in the forward outer surface of the body. Four depressions

are formed in the ogive just above the flange. These depressions rest on the upper rim of the body.

c. Body union.— The body union (see fig. 10) is a cylindrical component open at both ends. It is 0.78" in height and 1.25" in diameter. At the forward end, the body union is reduced to 1.058" in external diameter for a distance of 0.25" and is tapered internally. This allows the union to fit into the hexagonal hole in the rear of the body, where,



after insertion, it is crimped into place. The central hole of the union is threaded to seat the stabilizer-tube assembly.

14 STABILIZER ASSEMBLY

a. Functions.— The stabilizer assembly has the following functions:

(1) To house the fuze and propellant. This part of the rocket is called the "motor," i.e., the part that does the propelling.

(2) To house the electric firing attachment.

(3) To serve as an escape vent for the propellant gases.

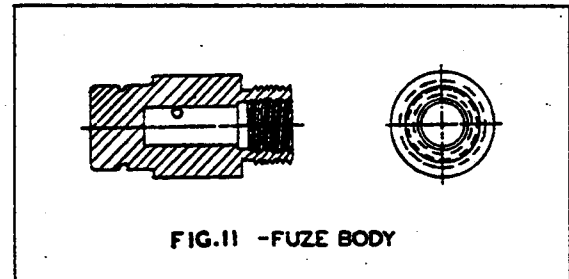
(4) To stabilize the rocket in its flight.

b. Components.— The stabilizer assembly consists of the stabilizer-tube assembly, fin assembly, electric wiring and connections, and trap assembly. The components are described in the following subparagraphs.

(1) Stabilizer-tube assembly. This component (see fig. 6) consists of a stabilizer tube, a fuze body, a safety pin, and a fuze.

(a) Stabilizer tube.— This component (see fig. 6) is made of steel tubing 6.322" long and 1.060" in internal diameter with walls 0.095" thick. The forward rim of the tube is chamfered; the rear 0.44" of the tube is externally threaded.

(b) Fuze body.— This component (see fig. 11) is a thick-walled cup, cut away on its forward part to form a



threaded projection 0.93" in diameter. The center section of the body is 1.25" in diameter; the rear section is 1.061" in diameter to allow a forced-fit joint in the forward end of the stabilizer tube. The over-all length is 2.317", and the central hole is 1.772" deep and 0.500" in diameter. At the point where the forward projection begins, the central hole widens to a diameter of 0.68". From this point forward, the central hole is internally threaded to seat fuze components. A hole 0.089" in diameter is drilled transversely through the fuze body just above the long axis of the body that intersects the central fuze body hole.

(c) Safety pin.— This component is inserted in the transverse hole mentioned in (b), above, where it restrains the firing pin of the fuze. Upon removal of the pin, the fuze is armed. When the safety pin is removed, **DO NOT DROP THE ROCKET.**

(d) Fuze.— 1 The fuze (see fig. 6) consists of a steel firing pin and a firing-pin spring. The firing pin is roughly cylindrical in shape and has a point 0.31" long protruding from the flat forward face. The firing pin slips into the central cavity of the fuze body, where it is held in a rearward position

M6A1 ROCKET

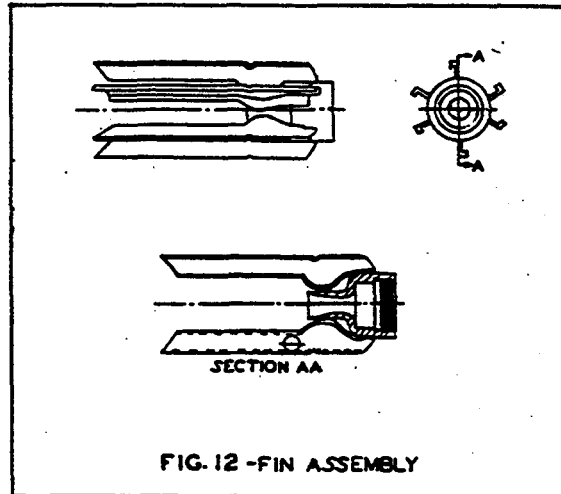
by the firing-pin spring. A circumferential groove, 0.045" deep, midway down the length of the firing pin, receives the safety pin when the latter is in place. The safety pin, when in this groove, holds the firing pin securely in a rearward position. When the safety pin is removed, the firing pin is free to move forward, restrained only by the action of the firing-pin spring. Dropping the rocket as little as 4' will provide sufficient impact for the firing pin to overcome the tension of the spring and cause the rocket to be detonated. Therefore, when the safety pin is removed, it is necessary to take every precaution not to drop the rocket.

2 Below and in line with the firing pin and spring is the M18 detonator assembly and the explosive charge. The detonator assembly consists of an aluminum detonator cup, 0.342" deep, 0.190" in diameter, and crimped at both ends. It is housed in a brass detonator holder that screws into the internally threaded opening of the fuze body. A brass booster cup, 0.480" deep, 0.530" in diameter, and externally threaded on the rim, is screwed into place in the fuze body after the detonator holder is fitted. The booster cup and the detonator holder are separated by an onion skin disk and a detonator-holder retaining disk. The second disk is made of aluminum and seals, in turn, the detonator holder in place in the fuze body. The lower or unthreaded external half of the booster cup extends beyond the fuze body, and, when the stabilizer assembly is screwed into the rocket body, the booster cup fits into a recess in the explosive charge.

(2) Fin assembly.— The fin assembly, which guides the rocket in flight, (see fig. 12) consists of six steel fins and the nozzle. Each fin is attached to the nozzle by two spot welds on the lower flange.

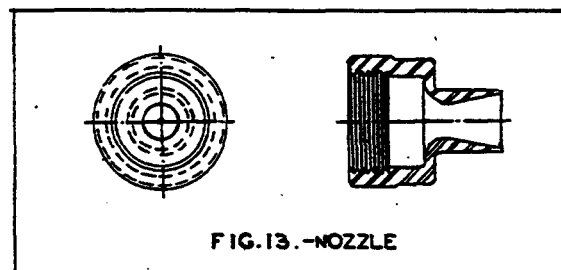
(a) The fins are made of sheet steel 0.041" thick and 5-1/2" long. The fins are flanged at top and bottom in the

shape shown in figure 12. In the upper edge of each fin is cut a notch 1-2/3"



from the leading edge. This notch is kept free of paint and is tinned with solder. On the side surface of each fin, an area 1/8" in diameter is treated similarly. All external surfaces of the fin assembly except the tinned surfaces of the fins, which are kept free as electric contacts, are coated with olive-drab lacquer enamel.

(b) The nozzle is a steel cup internally threaded at the forward end. The rear face of the cup narrows and continues to the rear, forming the nozzle proper. The internal surface of the rear half of the nozzle is curved smoothly, as illustrated in figure 13, and is given a fine finish. The forward



half of the nozzle is 1.49" in diameter; the rear half is 0.687" in diameter. Internal surfaces of the nozzle are coated with a light coat of priming paint.

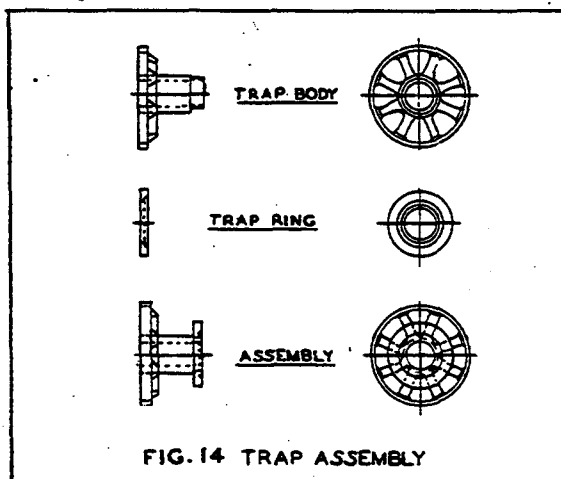
(3) Electric wiring and attachments.— This component ignites the propellant and is an electric squib with two insulated lead wires of unequal

length. The squib is thrust up into the stabilizer tube so that its forward end is approximately 5-1/2" forward of the rear end of the nozzle. Both lead wires, one 18-3/4" long, the other 6-3/4" long, extend rearward out of the nozzle. The short length is stripped sufficiently at its free end to allow it to be soldered to a tinned spot on one of the fins. The longer length of wire is wrapped twice about the under projection of one of the fins. The last 6-1/2" of the wire are laid bare, and a 1/2" length is folded back twice upon itself. Over this node of wire is wrapped a 6" length of 1/2" black tape. This taping facilitates grasping the end of the wire. The wire is then spiraled to take up its slack, and the free end is reversed and taped lightly (with cellulose tape) to the rear end of a fin (see fig. 6). When the rocket is loaded into the launcher, the wire is torn from the tape and its bared length engaged in the launcher clips.

(4) Trap assembly.— The trap assembly, which holds the propellant in the best burning position, consists of a steel trap body and a trap ring, shaped as illustrated in figure 14, the trap ring being staked to the trap body. The assembly is either cadmium or zinc plated.

(a) The trap body is made of steel and has eight equally spaced ribs.

(b) The trap ring is made of steel.



c. Assembly.— The fuze body is inserted in the forward end of the stabilizer tube and is held in place by the tight fit required. A silver-solder ring is slipped down the tube and, upon heating, melts and seals the internal joint between fuze body and tube. Following this, a dome-shaped disk is slipped down the tube, convex side up, and pressed flat against the fuze body. The disk is a safety factor; it removes the possibility of propellant flames or gases working through or around the fuze body to cause premature functioning of the rocket. The firing pin is inserted and the safety pin run through the transverse hole and the firing-pin groove. The detonator holder, with detonator, is screwed into the fuze body, followed by disks and the booster cup. The propellant is inserted in the tube. The trap assembly is screwed into the large opening of the nozzle, where it rests on the rim just below the internal threads. Then the fin assembly is screwed onto the rear threads of the stabilizer tube. Pettman cement is applied to the threads of the nozzle to waterproof the thread mesh. The rear end of the nozzle is closed with a chipboard disk, which is notched to provide for the passage of the lead wires.

15 EXPLOSIVE COMPONENTS

a. Propellant.— The propellant consists of five sticks of ballistite, each 0.36" in diameter and 4.15" long. The rocket is not loaded by weight but by length of powder stick — the purpose being to keep the pressure for various rounds at a relatively constant value. On the average, however, the propellant weighs approximately 61-1/2 grams. The propellant and its components are loaded as follows: A spacer tube, made of kraft paper, 1" in diameter and 3/4" long, is slipped into the stabilizer tube, coming to rest against the flattened disk. The five propellant sticks are slipped into the tube, coming to rest upon the rim of the spacer. When the

M6A1 ROCKET

nozzle is screwed onto the stabilizer tube, the propellant sticks rest on the rim of the trap ring and are held securely in place.

b. Other explosive components.— The body contains the explosive charge, and in the fuze body are the M18 detonator and the booster. The detonator consists of an upper detonator charge of 0.98 grains of lead azide and a detonator pellet of 1.26 grains of tetryl. The booster charge is a pellet of tetryl weighing 1.86 grains.

16 PAINTING AND MARKING

a. Painting.— All external surfaces of the complete rocket are coated with olive-drab ammunition paint. Those surfaces previously mentioned as being unpainted remain so.

b. Marking.— Just below the joint of ogive and body, the name of the round, the lot number, the manufacturer's initials, and the month and year of loading are marked circumferentially with yellow marking ink. All the letters and figures are 3/8" high. Sample marking:

ROCKET, H.E., A.T., M6A1

Lot 1234-56, P.A. 9-43

17 PACKING

The M6A1 rocket is packed one per individual fiber container, M87 (see fig. 15). Twenty such loaded containers are packed in a wooden packing box. The box, complete with contents, weighs approximately 136 lb. and is equipped with two rope handles to facilitate its handling.

a. Container, M87.— This container follows the standard design for fiber containers, consisting of a cylindrical tube and cover of laminated asphalt-filled chipboard. The container is 22-1/2" long and 2-3/4" in diameter. The tube and cover are each closed at one end with aterneplate end plate. A plywood support ring rests on a chipboard spacer at the lower end of the tube. — It prevents the nose of the rocket from touching the end plate.

After the round is inserted in the container, the cover is sealed in place by means of a strip of 2" adhesive tape 20-1/2" long. This strip is olive drab in color and has the designation of the rocket (Rocket, H.E., A.T., 2.36", M6A1) marked on it in yellow figures and letters.

b. Packing box.— (1) The packing box (see fig. 15) is 18-2/3" x 13-1/2" x 24-1/2" and is sturdily constructed of 3/4" lumber reinforced by end and top cleats. Two 16" lengths of manila rope are securely attached to opposite sides of the box and serve as carrying handles. The box is stained a light brown, and all the exposed metal parts are painted with light-brown lusterless enamel. The box has identifying marking (see fig. 15) in black paint.

(2) The 20 loaded containers are inserted in the compartments (formed in the box by fiberboard dividers) so that adjacent containers are tail end up and nose end up, respectively.

18 SAFETY PRECAUTIONS

a. The safety pin should be removed only after the nose of the rocket is placed in the launcher.

b. The rocket is sensitive and will function if dropped on its nose upon a hard surface from a height of 4'. Do not remove the safety pin except as explained above. Even when still in the packing containers the rockets must not be subjected to rough handling.

c. Rockets which have been unpacked but not fired should be returned to their original packing containers. The safety pin and the nozzle disk must be in place. The fiber container should be resealed with the adhesive tape.

d. Rockets should be stored in a dry, cool place. They should not be stored where temperatures exceed 120° F., and they should not be exposed to the direct rays of the sun.

e. Face guard and gloves must be worn when the rocket is fired.

SECTION II

ROCKET, PRACTICE, 2.36", M7A1

19 GENERAL

The M7A1 rocket (see fig. 15) is similar in design and construction to the M6A1 rocket, lacking only an explosive charge. It has the same dimensions, weight, and trajectory as the H.E. rocket. It is fired in the same ranges as the M6A1 without the cost or danger incidental to firing the H.E. round.

a. Weight rod.— A steel rod, 5.33" long, 0.75" in diameter, and threaded at one end, is fitted into the fuze body. This rod makes up for the weight of the explosive charge and fuze present in the M6A1 rocket. All other components of the M7A1 practice round are similar to the components of the M6A1 rocket.

b. Use.— After it has been fired, the practice rocket, M7A1, may be used again as a dummy round in teaching methods of loading and handling.

c. Painting and marking.

(1) Painting.— All external surfaces of the M7A1 practice rocket, are coated with blue lacquer enamel. Fin surfaces serving as contact points for the igniter system are left unpainted and are tinned with solder.

(2) Marking.— In the same position as on the M6A1 H.E. rocket, the nomenclature of the round, the lot number, and month and year of manufacture appear in white marking ink.

d. Packing.— (1) The practice rocket is packed in the same manner and in the same container as the M6A1 rocket (see par. 17). The sealing strip for the container is light blue, and the appropriate nomenclature is stenciled in white.

(2) Twenty containers are packed into the wooden packing box in the same manner as the H.E. M6A1 round. The packing box is identical but is marked to correspond with the contents. In addition, a 3" blue band encircles the box when the contents are practice rockets. Blue paint is also applied to the vertical cleats at each end of the box.

e. Precautions.— The same precautions described in paragraph 18 must be exercised in the storage and handling of the practice rocket. However, since there is no bursting charge or firing mechanism, the removal of the safety pin does not arm the M7A1 rocket.

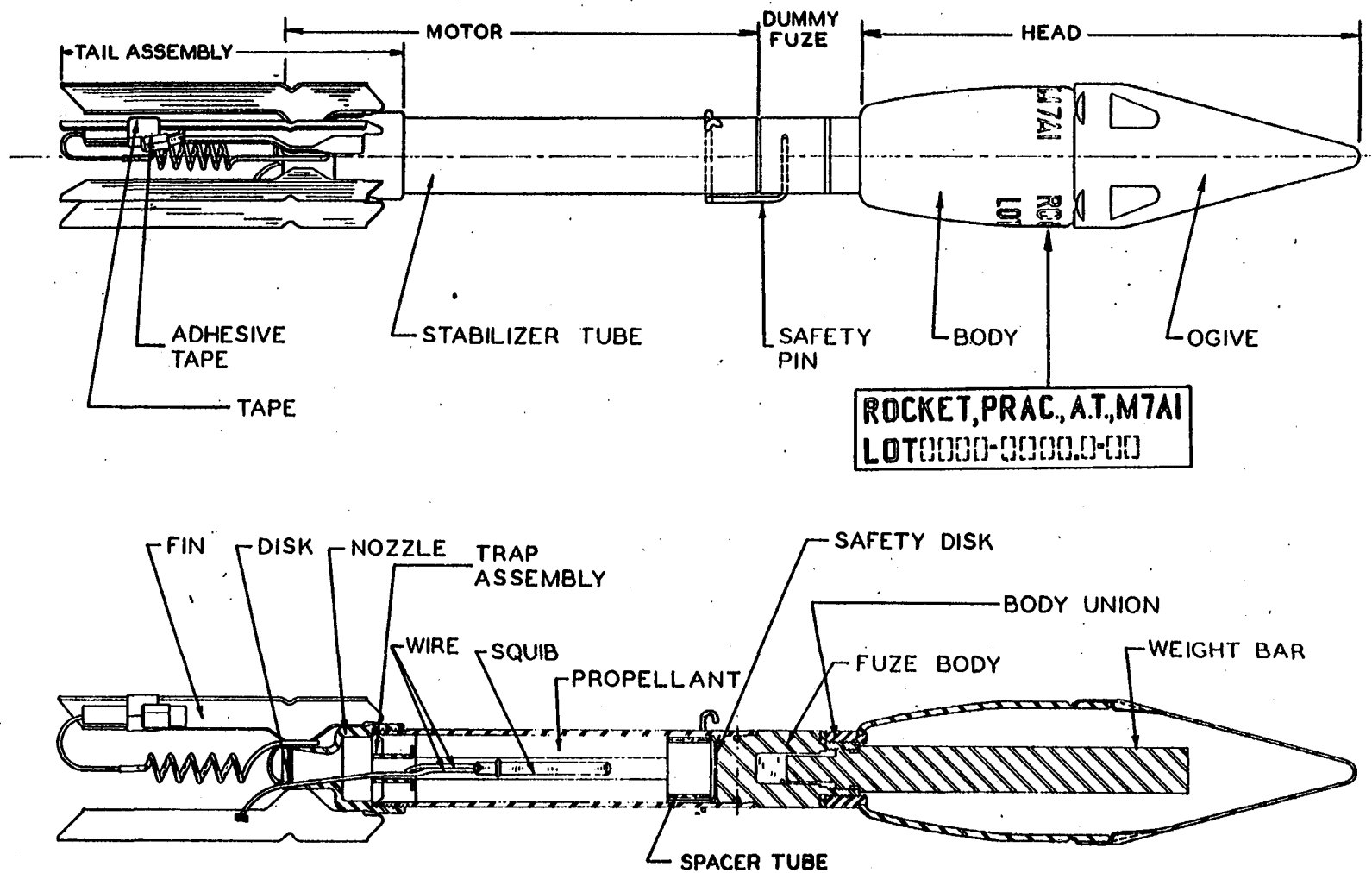
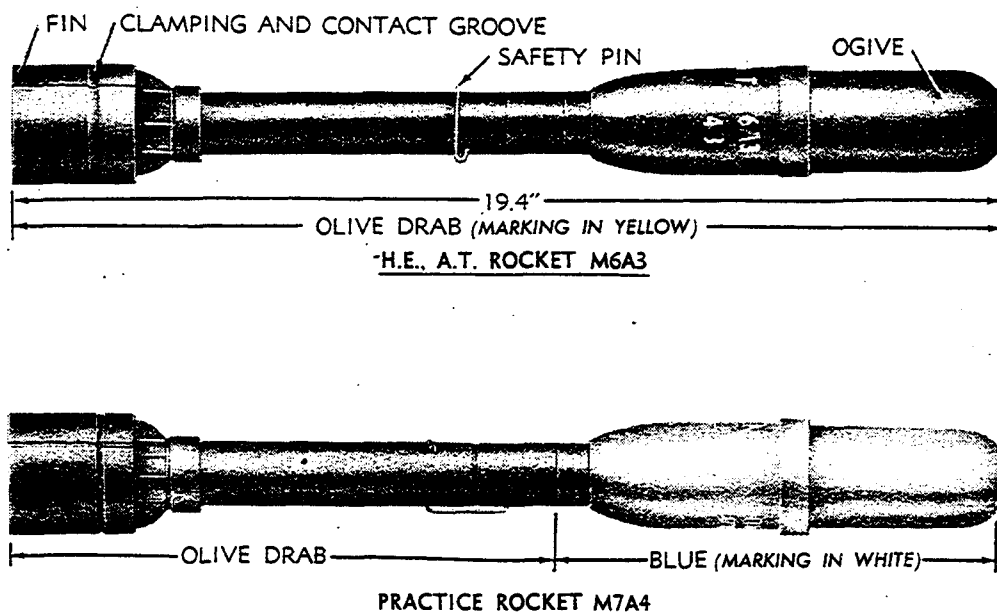


FIGURE 16. - ROCKET, PRACTICE, 2.38", M7A1

RESTRICTED

M7A1
ROCKET

2.36-inch Rockets



RA PD 104807

Figure 21 — 2.36-inch Rockets: HE, AT, M6A3 and Practice M7A4

b. Data.

	M6A1	M10 M6A3	M10A1 M6A3D	M10A2 M10A3 M6A3F M6A4 M6A5
Range (max)	600 yd	700 yd	700 yd	700 yd
Dispersion	8.5 mils	6 mils	6 mils	6 mils
Velocity (max)	265 ft per sec	270 ft per sec	270 ft per sec	275 ft per sec
Temperature limits	0 to 120 deg F	0 to 120 deg F	-20 to +120 deg F	-40 to +120 deg F
Burning time	0.08 to 0.03 sec	0.08 to 0.03 sec		
Burn-out point (feet from muzzle)....	(Normally within launcher)			

16. **2.36-INCH HE,AT ROCKET M6.** This rocket and the corresponding practice rocket M7 are no longer issued, but are to be held for modification to the corresponding A1 models. They resemble the rockets M6A1 and M7A1, but may be distinguished by a contact band, on the nose of the rocket, which is connected to the igniter lead by a wire taped to the body.

17. 2.36-INCH HE,AT ROCKET M6A1.

a. **Data.** This rocket (fig. 20) is 21.6 inches long and weighs 3.4 pounds. The head is 8.8 inches long and weighs 1.57 pounds. It contains a half-pound charge of pentolite. The propellant consists of 5 cylindrical grains each 0.375-inch diameter by approximately 4.15 inches long. This model may be identified by the pointed nose and the long, radiating fin assembly. The fuze of this model may be expected to function after removal of the safety pin by a blow on

2.36-inch Rockets

the nose equivalent to a drop of 48 inches on normal soil. It will ordinarily not function on impact with mud, loose sand, or water, nor on glancing impact with normal soil.

b. **Effect.** This rocket has effect against various targets as follows:

(1) **ARMOR PLATE.** Penetration of armor found on most tanks may be expected at all ranges. A hole is blown through the armor and heated particles of metal are sprayed through in a cone-shaped pattern. Any ammunition within this pattern is usually exploded.

(2) **MASONRY.** Penetration of brick and masonry from several inches to a foot or more may be expected, depending on quality of structure.

(3) **STRUCTURAL STEEL.** Produces shattering effect against cast steels and such materials as girders and railroad rails. Produces extensive damage, probably irreparable, to motor blocks.

(4) **WOOD.** Penetration of timber from several inches to a foot or more may be expected, depending on the timber.

(5) **SOIL.** Impact with ground at ranges below 300 yards will ordinarily result in a ricochet rather than a detonation. At ranges in excess of 300 yards, the angle of impact is steep enough to cause a detonation which resembles that of a 75-mm high-explosive shell. However, impact on a very soft material such as mud, soft sand, or water will not cause detonation of the rocket.

(6) **FRAGMENTATION.** Fragmentation and antipersonnel effects are slightly greater than 60-mm mortar shell.

18. 2.36-INCH HE,AT ROCKET M6A3.

a. **Data.** This rocket (fig. 21) is 19.4 inches long and weighs 3.4 pounds. The head is 8.8 inches long and weighs 1.64 pounds. It contains a half-pound shaped charge of pentolite. The propellant and fuze are similar to those of the rocket M6A1 described above. This model may be identified by the rounded nose and shrouded fin assembly.

b. **Effect.** This model has effect similar to the rocket M6A1 described above.

19. 2.36-INCH HE,AT ROCKET M6A3: MODIFICATIONS.

a. **2.36-inch HE,AT rocket M6A3C.** This model (fig. 22) is similar to the rocket M6A3 described above, except that the detonator cover has been omitted in the fuze, thereby making the fuze extremely sensitive. This model will function (with safety pin removed) on a blow equivalent to a drop on normal soil of only 11 inches. Rocket M6A3C is marked, for additional identification, by a half-inch white band around the ogive. The effect of this rocket is similar to that of the rocket M6A1 described above (par. 17),

2.36-inch Rockets

except that function may be expected on glancing impact, or on impact with soft soil, heavy brush, or hedge.

b. **2.36-inch HE,AT rocket, M6A3D.** This model is similar to the rocket M6A3C except that the propellant is T1E1 (salted) powder, which has better burning characteristics at lower temperatures. The temperature range for motors loaded with this powder is from -20°F to $+120^{\circ}\text{F}$.

c. **2.36-inch HE,AT rocket M6A3F.** This model is similar to the M6A3C except that the propellant is M7 (T4) powder. The safe temperature range is from -40°F to $+120^{\circ}\text{F}$.

20. 2.36-INCH HE,AT ROCKETS M6A4 AND M6A5. These models (figs. 22 and 23) are similar to the rocket M6A3F except for the fuze. Rocket M6A4 incorporates the base-detonating rocket fuze M400; rocket M6A5 incorporates the fuze M401 (par. 46). Both fuzes employ a bore-riding pin which keeps the fuze unarmed until the rocket leaves the launcher.

21. 2.36-INCH WP SMOKE ROCKET M10.

a. **Data.** This rocket (fig. 24) is 17.1 inches long and weighs 3.4 pounds. The head is 5.9 inches long and weighs 1.64 pounds. It contains a 0.9-pound charge of phosphorus. The propellant consists of five cylindrical grains each 0.375-inch diameter by approximately 4.15 inches long. This model may be identified by appropriate markings and by the short head without smoke ports. The fuze is similar to that of the HE,AT rocket M6A3 except that the booster is replaced by a long detonator-burster extending into the head (fig. 6).

b. **Effect.** The WP smoke rocket bursts on impact to produce a spray of phosphorus particles over a radius of 25 yards. The phosphorus ignites spontaneously on contact with air and produces a dense white smoke. The smoke itself is harmless but the burning particles produce painful burns.

c. **Development models.** During development, the white phosphorus smoke rocket M10 was designated T26E2. The rocket T26E1 differs only in internal burster details; the rocket T26 differs in that the motor is equipped with the long fin, similar to that of the HE,AT rocket M6A1.

22. 2.36-INCH WP SMOKE ROCKETS M10A1 AND M10A2. These models differ from the white phosphorus smoke rocket M10 only in the type of propellant. The motor of the rocket M10A1 is loaded with salted powder T1E1; the safe temperature range of this model is -20°F to $+120^{\circ}\text{F}$. The motor of the rocket M10A2 is loaded with powder M7 (T4); the safe temperature range is -40°F to $+120^{\circ}\text{F}$.

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR THE FORMER
PORT ANGELES COMBAT RANGE
PORT ANGELES, WASHINGTON
PROJECT NUMBER F10WA003301

APPENDIX E
REPORTS/STUDIES

APPENDIX E
REPORTS/STUDIES

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SITE SURVEY SUMMARY SHEET
FOR
DERP-FUDS SITE F10WA003300
PORT ANGELES COMBAT RANGE
CLALLAM COUNTY, WASHINGTON
MAY 1993

SITE NAME: Port Angeles Combat Range.

LOCATION: The former Port Angeles Combat Range is located approximately 8 miles southeast of the city of Port Angeles (see attached map).

SITE HISTORY: The range, covering approximately 1,600 leased or permitted acres, was established by the Army for use by the 115th Cavalry (mechanized). The range was used for weapons practice with 37 mm and 75 mm projectiles, 81 mm mortars, and various small arms. High explosive shells and solid rounds were utilized. There is no record of construction on the range beyond the erection of a 30-foot-high observation tower near the northern boundary adjacent to the firing line, and the placement of targets (at least two derelict tanks and various smaller items) at several unspecified locations to the south. Direction of fire was to the south. Reportedly, the local National Guard unit occasionally used the range for rifle firing practice. Apart from approximately 100 acres of cleared pasture in the northeast sector, the setting is rugged, heavily forested terrain.

In April and May 1945, all leases and permits were terminated, and DOD use of the land ceased. No cleanup of targets or dedudding was undertaken. A series of events, detailed below, subsequently led to the reacquisition and disposal of a portion of the range.

a. On 8 August 1948, two young local boys, 11 and 13, were killed while cutting wood on the range. They encountered a high explosive 37mm round buried in a tree, extracted it, and subsequent handling caused it to explode. In September and October 1948, the Army obtained 90-day exploration permits for the various properties which formerly comprised the range and initiated an inspection and dedudding program on the approximately 775 acres thought to be contaminated. This process continued from 1 October 1948 to 31 January 1949. The work consisted of using mine detectors to sweep all open fields and known impact/target areas. Trees which were thought to contain projectiles were cut down. Heavy timber, difficult terrain, and vastness of the area hampered clearing efforts. On 7 May 1949, a Certificate of Clearance was issued by the Commanding Officer of the 9800th TSU-CE Detachment No. 15 Bomb and Shell Disposal Team which stated that "Due to the use of high explosives, wide dispersity of fire and roughness of terrain it is recommended that these lands be restricted to surface use only." The perimeter of the area of contamination was subsequently posted with signs warning of the potential danger. The certificate was notarized in King County on 21 July 1949 and recorded in the Clallam County Court House 26 February 1953 (Recording No. 273166).

b. In September 1952, personnel from the 9800th TSU-CE Detachment No. 18 swept a 10-acre parcel in the contaminated area which had reportedly been missed during the 1948-1949 work. No explosives were found; however, the earlier restrictions on surface use only for the range was reiterated in the 22 September 1952 report by the detachment's Commanding Officer.

c. A visual inspection of the range was made by the 9800th TSU-CE Detachment No. 4 in November 1955. A Certificate of Clearance was issued 22 November 1955 which declared the range to be clear of impact areas except for one small (0.71 acre) parcel. With that single exception it was concluded that the lands could be used for any purposes to which they were suited.

d. Neutralization of the 0.71 acre contaminated land identified in c above was carried out by personnel from the 170th Ordnance Detachment of Fort

Lewis between 17 and 21 September 1956. Considerable scrap metal from a target tank was collected as well as various items of expended ordnance. The search was conducted visually and with the aid of an AN/PRS-3 mine detector set. No further land use recommendations were made.

e. A final clearance certificate for the facility was requested in 1957 by Office, Chief of Engineers, in reaction to the apparent contradiction between the all clear claim of the 22 November 1955 certificate, and a subsequent request for additional warning signs to post around the range. Another field inspection was made during the week of 28 January 1957 by elements of the 548th Ordnance Detachment. An undated Certificate of Clearance received by the Seattle District Engineer on 22 March 1957 stated that further actions toward clearing the area would not achieve a completely "free and clear" determination. Explosive rounds could exist undetected throughout the approximately 775 acres classified as potentially contaminated; however, further clearing efforts would be impracticable. It was recommended that the Federal Government purchase the land and limit any future use to surface only.

f. Authorization to reacquire the contaminated portions of the range from non-Federal landholders by lease was issued by the Chief of Engineers on 6 December 1954. Several property owners brought claims against the Government because of alleged loss of land values due to Army use, and leasehold interests were difficult to acquire. Fee acquisition was recommended in Real Estate Planning Reports of June 1954 and December 1959. By the end of 1962, a total of 627.93 acres fee and a 25 acre easement had been acquired. No action in connection with approximately 122 acres of Olympic National Park land within the 775 acres of supposed contaminated property appears to have been taken.

g. Following an inspection by Seattle District personnel of the open and accessible portions of the range in May 1965, it was recommended by the District Engineer that the fee and easement lands be declared excess and reported to the General Services Administration (GSA). By quitclaim deed (QCD) dated 10 October 1967, GSA conveyed 595.93 acres fee and the 25-acre easement to the city of Port Angeles to be incorporated into their watershed. The remaining 32 acres fee were deeded to a private party on 2 October 1967. The lands were conveyed with the stipulation that their use be limited to surface activities (no tilling or cultivation) and that the Federal Government would not be responsible for accidents stemming from their use as a gunnery range. (UXO warning signs are still in place along a short stretch of Deer Park Road which crosses the northeast corner of the range.)

As part of a former combat range and explosives neutralization study prepared for DAEN-ECE-G, personnel from the Naval Explosive Ordnance Disposal Technology Center at Indian Head, Maryland, visited the range in 1984. One day was spent walking portions of the area and operating detection equipment. No evidence of ordnance was found in the areas inspected. It was reported that residual ordnance density would be expected to be quite low, and that further clearing would be unfeasible.

In recent times, the pasture area has been leased for cattle grazing, but the forested areas within the Port Angeles watershed remain largely unused. The 32 acres conveyed to a private individual have been subdivided into 5 parcels for residential purposes. Further residential development can be expected in the surrounding area. Local residents reported no encounters with live ordnance on the range for many years although bits of debris from former targets (e.g. a length of tank tread or a piece of armor plate) can be seen in several locations in the pasture area.

PORT ANGELES COMBAT RANGE

F10WA003300

SITE VISIT: Seattle District personnel visited the site on 19 June 1985. They were accompanied by Messrs. Wayne Groff and Ron Johnson, city of Port Angeles, and Mr. Joseph Baron, local resident.

CATEGORY OF HAZARD: OEW

PROJECT DESCRIPTION: It is proposed that further evaluation of this site be carried out to better determine the hazards posed by the presence of unexploded ordnance to human health and the environment, and to identify what additional actions, if any, might be feasibly undertaken to reduce those hazards.

AVAILABLE STUDIES AND REPORTS: Various historical documents and real estate records. The site was used as a case study by the Naval Explosive Ordnance Disposal Technology Center (see Appendix B, Range Clearance Technology Assessment, NAVEODTECHCEN Technical Report TR-275, January 1986).

SEATTLE DISTRICT POC: Jonathan A. Maas, CENPS-EN-GT-HW, (206) 764-6745

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
FOR FORMERLY USED DEFENSE SITES
FINDINGS AND DETERMINATION OF ELIGIBILITY

PORT ANGELES COMBAT RANGE
CLALLAM COUNTY, WASHINGTON

SITE NO. FLOWA003300

FINDINGS OF FACT

1. The range, covering approximately 1,600 acres, was established for use by the Army's 115th Cavalry (mechanized). In 1943, portions of Olympic National Park and Olympic National Forest were made available to the Army, evidently by permit. Post-WWII memoranda indicate leases were acquired on private lands but none of the available documents or maps provide details about parcel ownership, sizes or boundaries. A small sketch map of the proposed range (undated but probably originating in early 1943) shows the facility comprised of an estimated 1,100 acres in private ownership and 500 acres in public land.

2. There is no record of construction on the range beyond the erection of a 30-foot-high observation tower near the northern boundary, and the placement of targets (at least two derelict tanks and various smaller items) at several unspecified locations to the south. The range was used for 37 mm and 75 mm projectiles, 81 mm mortars, and various small arms. High explosive shells and solid rounds were utilized. Reportedly, the local National Guard unit used the range for occasional practice.

3. In April and May 1945, all leases and permits were terminated, and DOD use of the land ceased. No cleanup of targets or dedudding was undertaken. On 8 August 1948, two young local boys, 11 and 13, were killed by an unexploded 37mm round they encountered while cutting wood on the range. This led to the reacquisition and disposal of a large portion of the former range as follows:

a. In September and October 1948, the Army obtained 90-day exploration permits for the various properties which formerly comprised the range and initiated an inspection and dedudding program on the approximately 775 acres thought to be contaminated. Additional exploration and clearance were carried out in September 1952, November 1955, and September 1956.

b. An undated Certificate of Clearance received by the Seattle District Engineer on 22 March 1957 stated that further actions toward clearing the area would not achieve a completely "free and clear" determination. It was recommended that the Federal Government reacquire the land and limit any future use to surface only. Authorization to reacquire the contaminated portions of the range from private landholders by lease was issued by the Chief of Engineers on 6 December 1954.

c. Several property owners brought claims against the Government because of alleged loss of land values due to Army use, and leasehold interests were difficult to acquire. Fee acquisition was recommended in Real Estate Planning Reports of June 1954 and December 1959.

d. Eighty acres including the site where the two boys were killed in 1948 were obtained in fee by condemnation on 19 September 1956. An additional 189.88 acres fee were condemned on 29 June 1962. A further 358.05 acres in fee, in three parcels, were purchased from three landowners in April and June 1962. A 25-acre restrictive easement (surface use only) with a 30-year term


was acquired 31 October 1955 for property owned by the city of Port Angeles. By the end of 1962, a total of 627.93 acres fee and a 25 acre easement had been acquired. No action in connection with approximately 122 acres of Olympic National Park land within the 775 acres of supposed contaminated property appears to have been taken.

e. Following an inspection by Seattle District personnel of the open and accessible portions of the range in May 1965, it was recommended by the District Engineer that the fee and easement lands be declared excess and reported to the General Services Administration (GSA). By quitclaim deed (QCD) dated 10 October 1967, GSA conveyed 595.93 acres fee and the 25-acre easement to the city of Port Angeles to be incorporated into their watershed. The remaining 32 acres fee were deeded (QCD) to Raymond L. Diehl, et ux., on 2 October 1967. The lands were conveyed with the stipulation that their use be limited to surface activities (no tilling or cultivation) and that the Federal Government would not be responsible for accidents stemming from former use as a gunnery range.

DETERMINATION

Based on the foregoing findings of fact, the site has been determined to be formerly used by the Department of Defense. It is therefore eligible for the Defense Environmental Restoration Program - Formerly Used Defense Sites, established under 10 USC 2701 et seq.

15 Sep 93
DATE



ERNEST J. HARRELL
Major General, USA
Commanding

PROJECT SUMMARY SHEET
FOR ^{OE}
DERP-FUDS PROJECT NO. F10WA003301
PORT ANGELES COMBAT RANGE
CLALLAM COUNTY, WASHINGTON
SITE NO. F10WA003300

PROJECT DESCRIPTION: The 1,100 acre Port Angeles Combat Range was operational between 1943 and 1945. The range was used for weapons practice with 37 mm and 75 mm projectiles, 81 mm mortars, and various small arms. High explosive shells and solid rounds were utilized. Repeated efforts to clear the range, most recently in 1956, have been unsuccessful. It is proposed that further evaluation of this site be carried out to better determine the hazards posed by the presence of unexploded ordnance to human health and the environment, and identify what additional actions, if any, might be feasibly undertaken to reduce those hazards.

PROJECT ELIGIBILITY: The site was controlled and used by the U.S. Army during the period it became contaminated by explosive ordnance.

POLICY CONSIDERATIONS: The lands were conveyed to post-DOD owners with the stipulation that their use be limited to surface activities (no tilling or cultivation) and that the Federal Government would not be responsible for accidents stemming from former use as a gunnery range.

PROPOSED PROJECT: This report should be referred to CEHND for evaluation and project scoping. At a minimum, it would be expected that additional archival research and a site visit would be carried out.

RISK ASSESSMENT CODE: 2 (Work sheet attached)

COST ESTIMATE: To be prepared by CEHND

SEATTLE DISTRICT POC: Jonathan A. Maas, CENPS-EN-GT-HW, (206) 764-6745.

HERITAGE PROTECTION

Any plan for 2.1 million acres of forest land must consider protecting its special features. Endangered, threatened and sensitive species of plants and animals, and cultural resources such as archaeological or historic sites are such features. The protection discussed in this section relates directly to them. The many natural resources (such as air, water and wildlife habitat) on forest land and protection measures for them are discussed in other sections.

Proposed heritage protection programs are discussed in three sections. First is Endangered, Threatened and Sensitive Species; next is Natural Area Preserves and the Registry Program; third is the program for Cultural Resources.

ENDANGERED, THREATENED AND SENSITIVE SPECIES

Based on designation by the Washington Natural Heritage Program AND THE WASHINGTON DEPARTMENT OF GAME NONGAME PROGRAM, rare plant and animal species are assigned to one of three categories:

1. **Endangered:** A vascular plant or wildlife species in danger of becoming extinct or extirpated in Washington within the foreseeable future if factors contributing to its decline continue. Populations have typically been reduced to critically low levels, or the habitat has been significantly degraded or depleted. (Extinction means the species is gone throughout its range; extirpation means it is gone from part of its range.)
2. **Threatened:** A vascular plant or wildlife species likely to become endangered in Washington within the foreseeable future if factors continue that contribute to its population decline or to habitat degradation or loss.
3. **Sensitive:** (a) A vascular plant species with small populations, or localized distribution, that is not now endangered or threatened, but whose populations and habitats will be jeopardized if current land-use practices continue. (b) A wildlife species of concern because of its uniqueness, rarity, scientific value or vulnerability to human disturbance or land-management activities.

There are 265 vascular plants listed by the Natural Heritage Program as endangered, threatened, sensitive or possibly extinct or extirpated in Washington. Of these, 10 are considered endangered, 41 threatened and 192 sensitive. One endangered, seven threatened and 31 sensitive plant species may occur on department-managed forest land (See Table 16).

The Department of Game Policy list (Department of Game Policy Manual .602) includes 30 species considered endangered or threatened. (Nine of the 30 are

Table -14- 16 Special Plants Actually or Potentially Found
on Department-Managed Forest Land
1983

Endangered

Showy stickseed
Hackelia venusta

Threatened

Long-bearded sego lily
Calochortus longebarbatus
var. longebarbatus
Clackamas corydalis
Corydalis aquae-gelidae
Clustered lady's slipper
Cypripedium fasciculatum
Twayblade
Liparis loeselii
Adder's-tongue
Ophioglossum vulgatum
Fringed pinesap
Pleuricospora fimbriolata
Thompson's clover
Trifolium thompsonii
Giant trillium
Trillium albidum

Sensitive

Pasque flower
Anemone nuttalliana
Least bladderly milkvetch
Astragalus microcystis
Anes milkvetch
Astragalus pulsiferae
var. suksdorfii
Bolandra
Bolandra oregana
Bristly sedge
Carex comosa
Green-fruited sedge
Carex interrupta

Sensitive cont.

Large-awn sedge
Carex macrochaeta
Golden chinquapin
Chrysolepis chrysophylla
Bulb-bearing water hemlock
Cicuta bulbifera
Tall bugbane
Cimicifuga elata
Spine-leafed goldthread
Coptis asplenifolia
Giant helleborine
Epipactis gigantea
Pink fawn lily
Erythronium revolutum
Black lily (Indian rice)
Fritillaria camschatcensis
Creeping snowberry
Gaultheria hispidula
Common bluecup
Githopsis specularioides
Gooseberry-leaved alumroot
Heuchera grossularifolia
var. tenuifolia
Treelike clubmoss
Lycopodium dendroideum
Pulsifer's monkey-flower
Mimulus pulsiferae
Branching montia
Montia diffusa
Pine broomrape
Orobanche pinorum
Great polemonium
Polemonium carneum
California sword fern
Polystichum californicum
Sullivanti
Sullivanti oregana
Purple meadowrue
Thalictrum dasycarpum
Sierra wood fern
Thelypteris nevadensis

Table -15- 17 Endangered and Threatened Animal Species
in Washington State

Species	Dependence on Forest Habitat			Range in State	Status Designated by	
	Residency	Total	Part		State	Federal
Grey wolf - <u>Canis lupus</u>	-		X	Cascades	E ¹	E
Grizzly bear - <u>Ursus arctos horribilis</u>	R ³		X	Selkirk & N. Casc. Mts.	E	T ²
Columbian white-tailed deer - <u>Odocoileus virginianus leucurus</u>	R		X	Low. Columbia River	E	E
Mountain caribou - <u>Rangifer tarandus montanus</u>	R		X	Selkirk Mt.	F E	
✓ Bald eagle - <u>Haliaeetus leucocephalus</u>	R	X		Coast/state	T	T
✓ Peregrine falcon - <u>Falco peregrinus</u>	R		X	Coast/state	E	E
✓ Spotted owl - <u>Strix occidentalis</u>	R	X		West. Wash.	T	

¹Endangered, ²Threatened, ³Resident, ⁴Migrant

whales and sea turtles.) Probably half of the 12 birds listed use forest lands at least sometime.

Formal procedures and laws (state and federal) to protect endangered, threatened and sensitive species began in Washington in 1972 with passage of the State Natural Area Preserves Act (79.20 RCW). In 1973, the federal government passed the Federal Endangered Species Act (Public Law 93-205). This law was directed at animal species until 1978, when it was amended to include plants. The legislature has assigned responsibility for carrying out the intent of this law to the DNR (through the Natural Heritage Program) and the Department of Game (WDG).

Temporary lists of federal endangered and threatened species compiled by the Smithsonian Institution were published in the Federal Register in June 1976.

The Washington Natural Heritage Program was formed in 1977 by The Nature Conservancy, a private nonprofit organization dedicated to identifying and protecting ecologically significant natural lands. The Heritage Program began as a cooperative effort between the Conservancy and five state agencies (DNR,

RANGE CLEARANCE TECHNOLOGY ASSESSMENT

JANUARY 1986

FINAL REPORT

Distribution limited to U.S. Government agencies only; Test and Evaluation; May 1985. Other requests for this document must be referred to the Commanding Officer, Naval Explosive Ordnance Disposal Technology Center, Indian Head, MD 20640-5070.

**Prepared by
NAVAL EXPLOSIVE ORDNANCE DISPOSAL TECHNOLOGY CENTER
Indian Head, Maryland 20640-5070.**

Recovery of ferrous ordnance and debris in an area with low visibility may be accomplished by using electromagnetic recovery techniques. The Magnetic Pickup (MAGPI) could be used to recover fragments and other ferrous objects to permit the use of ordnance detectors for location of buried objects.

Subsurface Clearance. According to the records, the ordnance items used on the range all contain ferrous material. For location of a specific buried ferrous item a magnetometer will provide the best capability in areas with low contamination density. A ganged locator system utilizing magnetometers, ground penetrating radar, or a hybrid system is being developed and may be useful in the accessible areas.

CONCLUSION:

As a result of an on-site survey and records search, the following conclusions are made:

1. The future use of the Port Angeles Combat Range is scenic and livestock grazing.
2. Access to virtually all of the range is extremely limited due to terrain and vegetation.
3. HE filled munitions have been used on the range.
4. Surface and selected subsurface clearance previously has been accomplished.
5. Additional mechanical clearance of the range is environmentally, technically and economically unfeasible at this time or in the foreseeable future.

RECOMMENDATIONS:

It is recommended that:

1. The Port Angeles Combat Range not be considered for mechanical clearance in the foreseeable future.
2. An investigation be conducted to determine the effect of natural processes on unexploded munitions.
3. Restrictions placed on the use of the land remain in force.

COPY VERBATIM FROM:

REPORT OF INVESTIGATION OF INCIDENT RESULTING

IN DEATH OF HOWARD AND HOMER SWAGERTY

1. As directed by the Chief, Legal Branch, Seattle District, Corps of Engineers, pursuant to instructions contained in 3rd Indorsement from the Division Engineer, North Pacific Division, Corps of Engineers, dated 9 September 1948, I left the Seattle district Office at approximately 7:55 A.M. on Tuesday, 21 September 1948, S.D.S.T., and arrived at Port Angeles, Washington, about 10:30 A.M., P.S.T., to investigate the death of Homer and Howard Swagerty. Karl Kirk, Clallam County Sheriff, County Courthouse, Port Angeles, Washington, was the first person I contacted. He stated that he had made an informal investigation of the accident, but that no formal or written report had been made by him or his office. He related briefly the facts pertaining to the accident, which corroborated the facts herein developed. He referred me to Howard V. Doherty, Chief Deputy Prosecuting Attorney for Clallam County. Mr. Doherty, whose office is in the Kuppler Building, Port Angeles, Washington, stated that no official or written report concerning the incident had been made by his office either, nor had any report been made by the County Coroner, since no criminal matter appeared to be involved. Mr. Doherty briefly reviewed the facts as he found them. It was his opinion that the two boys involved had been sawing pulp wood with their brother-in-law, Ralph Blivens, to make a little money for school clothes. In making a cut, their saw struck a shell lodged in a log, and became bound, whereupon they wedged a slab off, got the shell out and were playing with it when it exploded. He stated further that there was considerable evidence of other unexploded shells in the area and his primary concern was to prevent further incidents of this nature. I advised him that it was understood that steps were being taken to have the area dedudded immediately. Mr. Doherty gave me instructions and directions on how to find the place of the accident and the home of Clifford James Swagerty, Sr., and his wife, the parents of the two boys involved. He stated that the Swagertys and several of their relatives had settled in the area during the past ten years after coming from Oklahoma. Clifford Swagerty, Sr., and his immediately family had earned a reputation for being an honest, sober and hardworking family.

2. I then drove out to the Swagerty home which is located about two miles east on a road that intersects the Deer Park Road (Round Mountain Road) at a place known as Shults' Corner. The Swagertys were not at home, but Mrs. Ralph Blivens, a married daughter of the Swagertys who resides across the road from her parents, was found at home. Mrs. Blivens identified herself as the wife of Ralph Blivens, and the sister of Howard and Homer Swagerty. She stated that her husband was present at the scene of the accident when the two boys were killed. She advised me further that her husband was not at home, but he was expected from work after six that evening. She said that both of her parents, Mr. and Mrs. Swagerty worked in Port Angeles, but usually arrived home from work after seven o'clock in the evening. Since it would be too dark to investigate the scene of the accident after her husband returned home, Mrs. Blivens volunteered to accompany me to the place of the accident. We thereupon proceeded back to

Shults' Corner and continued south on the Deer Park Road slightly more than a mile, then turned right into a logging trail, passing through a barbed wire gate. The road led through the trees generally turning to the right, apparently skirting the field identified as belonging to Yerkes. The end of this crude road is in a recent clearing where second growth fir was being cut.

3. Mrs. Blivens pointed out the log where the boys had been sawing just prior to the accident, the stump some 75 feet southerly thereof near which the boys were found after the accident, and the place where her husband was working when the explosion occurred. It was obvious that she was quite familiar with the known facts concerning the accident from discussions had with her husband and other members of the family. I examined the area and observed the following physical facts which have also been sketched on the Exhibit I attached thereto. There were several stumps and down trees in the cleared area. A spar pole had been rigged near the northerly end of the clearing and some logs had been piled together westerly thereof. A steep bank, the east side of Morse Creek Canyon, bounded the area on the west; otherwise the area was wholly surrounded by trees and brush. The log, which the boys had been sawing when they discovered the shell imbedded in it, was laying south of the spar pole and about 75 feet more or less from the brink of Morse Creek Canyon. The log was lying in an easterly-westerly direction. It was about 14-16 inches in diameter and contained several shell or small arms scars. About four feet from the westerly end of the log, a cut had been made about one-quarter through. A slab had been wedged off this four-foot section, as was evident from wedge marks at the end of the log and slab and near where the saw cut had been made. This slab was laying bark side down about a foot or two north of and parallel to the four-foot section of the log. A blackened hole into the center of the log at a 45 degree angle was apparently at the point where the saw cut had been made, indicating where the shell had probably been lodged. This hole was about an inch and one-half in diameter. Upon fitting the slab in its original place in the log, it appeared that the shell entered the log from the other side but had probably not pierced the surface of the top side. The saw cut crossed the place where the shell had lodged at about its middle. There were no indications of any explosion at or near the log which the boys were sawing. Located at a point some 50 to 75 feet south of the above-mentioned log is a stump which Mrs. Blivens pointed out as the place where the two boys were found after the explosion. An old, unpainted tool box about 3 feet high, 2 feet wide and about 4 or five feet long, was located immediately north of and lengthwise from the stump. The box, which was made of shiplap, had a loose fitting cover. It contained a rusty 5 or 6-foot cross-cut saw without handles, some dynamite caps and fuses, and nothing else. It may have contained other tools at one time, probably for fire-fighting purposes. The lid of the box was closed at the time of this investigation, but it was obvious that the lid was open at the time of the explosion, since there were three holes or scars on the lid which appeared to have been made by small particles of shrapnel. These marks indicated that the shrapnel had struck the lid from the inside while it was open and propped back against a sapling trunk. The stump, about three feet in diameter and about three feet above the ground, but from which the ground sloped somewhat, has a flat top. There were two railroad spikes driven close together into the west edge of the top. The top of the stump is scored by gouges in several directions from a point northeast of

the center of the stump. These gouge marks, although not too distinct, may have been made by shrapnel. Mrs. Blivens said that Howard had been found about four feet from the east side of the stump and Homer about the same distance from the opposite side of the stump, and that a fire axe was lying near Howard. At the time of the explosion, Mrs. Blivens said her husband was working bucking up a tree he had fallen about 25 to 50 feet southwesterly from the above-mentioned stump. The tree he was cutting had been felled across the road and a piece had been sawed out to permit passage along the roadway. There were no other evidences of how the incident may have occurred. There were several logs which had been dragged in to the spar pole and piled next to the edge of Morse Creek Canyon. All of these logs were scarred from shell fire and small arms. Also many of the trees standing in the area had been scarred and some had the tops shot out.

4. I then returned Mrs. Blivens to her home. She gave me the names of the doctors who had attended the boys before their death, and stated that she and her husband and others in the family had been down to their attorney Stanley Taylor, and had given him statements relative to the accident. Upon my return to Port Angeles immediately thereafter, I called on Doctor Irving Kaveney, 505 South Lincoln, Port Angeles, Washington, one of the physicians said to have attended Homer Swagerty. In an interview with Dr. Kaveney, he stated he had been called in by Dr. Kintner to perform the surgery for Homer, the younger boy. He described the boy's injuries generally as being a severed large bowel, the lower part of the liver severed, and a part of the muscle from the inside of the thigh of one leg shot away. He stated that he performed as much surgery as was possible under the circumstances. He indicated that death resulted from shock which usually accompanies injury to the large bowel. He did not attend Howard since he was dead at the time medical aid arrived. He stated, however that Howard had died of a direct heart wound. Dr. Kaveney, at my request, promised to submit a detailed medical report to accompany this report. Then I called on Dr. Quentin Kintner, 208 South Lincoln Street, Port Angeles, Washington. Dr. Kintner said he was called to the hospital when the two Swagerty boys were brought in. He stated that he examined both boys and found Howard dead when he arrived from an injury in the vicinity of the heart. The injuries of the younger boy, Homer were described generally as Dr. Kaveney had described them. Dr. Kintner also stated that he had an opportunity to talk to Homer about the accident before he died. He stated that Homer said they were sawing a log, that the saw hung in the log, then when they tried to wedge a slab off to get the saw out it "blowed" them up. Dr. Kintner stated that he would also submit a detailed medical report to accompany this report and include the statements made by Homer before he died.

5 I thereafter interviewed Mrs. McDonald of McDonald Mortuary, 115 West 4th, Port Angeles, Washington. She stated that she was the owner of that establishment and was familiar with the business transactions of the firm, and particularly with the funeral arrangements for Howard and Homer Swagerty. She stated that the complete funerals for Howard and Homer were identical and that a double service was held. The charges for casket, embalming, use of chapel, hearse, funeral cars, and personal services rendered by the mortuary for each

funeral were \$345.00 each, plus sales tax of \$5.17, and \$15.00 each for two cedar burial vaults, plus 45¢ sales tax. That in addition to the above, there was a charge of \$10.00 for music and minister for the joint services. The total for the above was \$741.25. Mrs. McDonald stated that the above did not include cost of two graves at Mt. Angeles Cemetery or the charges for opening and closing the same made by the cemetery, nor did it include flowers purchased by the family. These expenses were arranged for separately by the family. She volunteered during this interview that Mr. Swagerty had borrowed \$500.00 from the agency of Mr. William Polain, which amount was applied to the funeral bill. This balance of this bill was still unpaid.

6. Thereafter, I contacted Mr. Stanley A. Taylor, Adwell Building, Port Angeles, Washington, attorney for the Swagertys. He stated that he had been gathering factual data relative to the accident with a view to presenting a claim against the United States. He stated that he had been in touch with his Congressman (probably Henry M. Jackson) and was considering a claim under the Federal Tort Claims Act of 1947. He stated further that he welcomed any investigation being made by the Government, and had no objections to my interviewing his clients or any of the witnesses. He read from several statements he had taken as to the accident, and all apparently corroborated the facts developed by this report. He was confident that there was negligence on the part of the United States in abandoning this site as a firing range without giving any warning to the residents of the area as to its potential danger. He stated that he had not yet decided as to the amount for which he expected to make claim, but believed that it would be in excess of the amount authorized for administrative settlement. He believed there was not contributory negligence on the part of the two boys who were killed, or anyone else, if boys ages 11 and 13 can be held contributorily negligent in a case like this. Mr. Taylor stated that he was a native of Clallam County, and that he was graduated from the University of Washington Law School in 1934 and had practiced law in Port Angeles ever since. He appeared to be an intelligent and honest lawyer. He volunteered to accompany me the next morning at 9:30 to the area where the accident occurred to point out other shells or mines in the area that he had seen since the accident.

7. That evening about 6:30 P.M. I again drove out to the home of Ralph Blivens and interviewed him relative to the accident. Mr. Blivens gave his address as Route 2, Port Angeles, Washington, and his age as 32. He stated that the boys, Howard and Homer Swagerty, were his brother-in-laws, and had lived with their parents across the road. He stated that he had been engaged by Mr. A. W. Doty to cut pulp logs from timber owned by Owers Brothers of Port Angeles, Washington. The stand of timber he was engaged in cutting was described by him as the same as was previously shown to me by Mrs. Blivens. He stated that on Sunday, August 8, 1948, the day of the fatal accident, the boys had accompanied him that morning to the place he was working. He indicated that the boys apparently enjoyed going with him to work on occasion. At the time of the accident, between 11:30 A.M. and 12:00 Noon, he was cutting up a tree, which he had fallen, into four foot pulp logs, and the boys were some distance away sawing on another log. He was working with his back to the place where the boys were sawing. The boys brought a round iron object about an inch and a half in

diameter and about six inches long to him and he took it in his hand and inspected it. They said they had found it in the log and he noticed a couple saw teeth marks on it. The boys stated that they wanted to take the object home with them and he handed it back with his assent, not knowing the danger. He supposed it to be a harmless shell, since he had never had any experience in such things. Thereafter he turned to his sawing and he supposed the boys went back to theirs. He stated that he thought he heard them hammering on a wedge or similar object. In any event, about 15 minutes, more or less, after he had looked at the shell, he heard a loud explosion and particles flew through the leaves and twigs above his head. On turning around, he heard Homer cry out and saw him fall to the ground. Howard was lying on the east side of the stump located 30 - 40 feet north of where he was working and Homer had fallen on the opposite side of the stump. He stated that the stump was about half way between where he was working and where the boys had been working. After seeing that both boys were seriously injured, and, as he put it, their entrails were showing, he cut a section out of the down tree which he had felled across the trail to the car. He put Howard in the back seat of the car and Homer in front. Mr. Blivens stated that Howard was already turning white when he picked him up to put him in the car, but that Homer was conscious at all times until after their arrival at the hospital. Homer complained of his wounds when Blivens was driving out over the rough logging road at high speed until they got on the main road, which necessitated his proceeding a little slower until they reached the main road. Thereafter, he drove as speedily as possible to the Port Angeles General Hospital. He stated that Dr. Kintner arrived about 15 minutes after he arrived at the hospital, but that Howard was already dead. Mr. Blivens stated that he had come from Oklahoma to the Port Angeles, Washington, area about ten years ago and been engaged in pulp-wood cutting and logging ever since. Although Mr. Blivens did not appear highly intelligent or well educated, he did appear honest and unevasive in this interview, and there were no apparent discrepancies with the physical facts or the statements previously made by him to the prosecuting attorney's office or to Mr. Taylor, Swagerty's attorney.

8. After the above interview, Mr. Blivens and I went over to the Swagerty home across the road, since it appeared that they had arrived from work. Mr. Clifford James Swagerty, Sr., and his wife, Mrs. Alta Swagerty, stated that they were the parents of Howard and Homer Swagerty and consented to an interview. They stated that at the time of the accident and prior thereto, they had seven children living, two daughters and five sons, and gave the following information during the interview. Both daughters were married as were the three older boys. Howard and Homer were the youngest of their children. Howard was 13 and was expected to enter High School in September, 1948. Homer was 11 and was expected to enter High School the next year. The family had lived in Port Angeles, near Lincoln High for several years prior to moving to their present home in the country. In fact, they had only moved to their present residence a few months prior to the accident. The two boys killed by the accident were healthy, energetic, and apparently well liked by most of the neighbors around their old home in town, since the family received 108 consolation cards at the time of the funerals. Neither Mr. or Mrs. Swagerty were able to add information concerning

the accident since they were both at work at the time. The boys had gone with Ralph Blivens to help cut pulp wood so that they could have some place to go where they could carry their lunch. They were not employed by anyone to cut pulp wood. Mr. Swagerty is employed by the Washington Pulp Company, a subsidiary of Crown-Zellerbach Corporation, and had been during the past 7 or 8 years. Mr. Swagerty volunteered that during his employment with Washington Pulp Company he had earned about \$19,000.00 and that about \$9,000 of this sum had been earned in the last two years. His work classification is that of Loader-man at the mill, but he also gets considerable overtime pay for odd jobs such as watchman and for setting knives on the mill after regular hours. Mrs. Swagerty is employed at the Club Cafe in Port Angeles and has been so employed for the past several years. They own, or are purchasing, a ten-acre tract of land, which is the site of their present home. They have and are building a modest house, still incomplete. The house and grounds are relatively neat appearing and the home was furnished with inexpensive furniture. They have a 1946 Ford Sedan. From all appearances, Clifford Swagerty, Sr., and his family were generally without much cash or property. They had come from Oklahoma about ten years ago with about \$14.00 when they arrived. Both Mr. and Mrs. Swagerty appeared to be honest, sober, and hard working people. They stated that their funeral expenses for their two boys were \$345.00 and for each funeral plus \$15.00 for each burial vault, ten dollars for minister and music, plus tax, all with McDonald Funeral Home. Also, they paid to Mt. Angeles Cemetery the sum of \$110.00 for two grave lots and for opening and closing the same. In addition, they purchased two wreaths of flowers from Toziers Flower Shop in Port Angeles at the cost of \$50.00 and bought \$30.00 worth of clothes from J. C. Penny & Company in Port Angeles in which to bury the boys. Mr. Swagerty stated that he had borrowed money to pay for the funeral expenses, in part, since he expended most of his cash in building the house. Except for \$20.00 for special nurse paid by the Swagertys, the hospital and doctor bill were paid through Clallam County Medical Service Corporation, of which Mr. Swagerty is a paid-up member. This organization pays family medical services for a stipulated monthly sum.

9. Mr. Swagerty volunteered to go with me that evening to the home of their son, Clifford Jr., to view the clothes worn by the boys at the time of the accident. We drove out to this son's house near Ocean View Cemetery west of the Port Angeles Airport. When we arrived, Clifford Jr., brought out the above mentioned clothing of Howard and Homer. They consisted of underwear shorts and shirts, dungaree pants and shirt or sweat shirt. These clothes, which had been washed since the accident were badly torn and tattered in front with holes and large pieces torn out as if by a shell burst. The belt buckle worn by Howard had been completely cut in two. The clothes indicated that the main force of the explosion had struck them both in the area of the abdomen. Clifford Swagerty, Jr., stated that he talked to Homer, his younger brother, after he came out of surgery. Homer stated to him that Howard and he were sawing a log, the saw hung in the log, and when they split a slab off to get the saw out, it "blowed" them up. This statement corresponds with what Dr. Kintner said Homer told him. The witness also stated that he visited the scene of the accident Sunday afternoon, the day of the accident. He found the saw the boys were using lying across the log they had been sawing. The slab was lying in the same position as it was when I made the investigation of the place. The wedge was lying near the slab and a hammer or sledge was near at hand. He did not recall

exactly where the axe they had been using was found but thought it was near the log also. He stated the Sheriff, who was there at the time, picked up Howard's glove, which had been shot from his hand, about four or five feet south of the stump near which the boys were found lying after the accident. This witness also stated that he had scouted the area since the accident for other shells. He said that the Pelikan boys, who live at Shults' Corner, had found a couple practice land mines and had thrown them into the canyon. He said he had taken one of these and had hidden it from other children near the fence along the Deer Park Road (Round Mountain Road) at a point south of the gate to Yerkes' south field. He also stated that one of the neighbors south of Pelikans (probably the lessee of Yerkes) had told him that he had found a shell and had carried it around in this tool box for a couple weeks. After the accident, it had been thrown out at the edge of the field. He stated that he had seen this shell, a round black cylindrical object about an inch and a half in diameter and about six inches long, and that it was lying at the south edge of Yerkes' field near where the logging road leading to the scene of the accident skirts the field. The place was marked by a large rock and a red string on a bush. After this interview, I returned to the hotel in Port Angeles about 10:30 P.M.

10. The next morning at 8:00 A.M., I called on Mr. Owens of Owens Brothers Construction Company. He stated that he had purchased the timber on the southwest quarter of the southeast quarter of Section Five and the northwest quarter of the northeast quarter of Section Eight, Township 29 North, Range Five West, Willamette Meridian, from the owner of the land, Fred W. Wachenheimer, 3272 McClintock, Seattle 44, Washington. His contract to remove this timber, made in May, 1946, for a two-year period expired in 1948 and was renewed for \$600.00 for an additional two-year period commencing 17 June 1948. He stated that he expected to make a claim for the timber that was ruined for mill or pulp use because of the presence of shell fragments and small arms slugs. In fact, he had completed the regular claim form and turned it over to his attorney, also Stanley A. Taylor. This claim was for 1,000 FBM felled and brushed timber valued at \$600.00, 350,000 FBM timber standing at \$5.00 per thousand, totalling \$1,750.00, 1,000 cords of wood at \$1.50 per cord, totalling \$1,500.00 and \$2,000.00 for road construction. Mr. Owens stated that none of the mills would take any of the timber in these sections because of the damage to mill machinery by the presence of metal and explosives in the timber. No comment is made on the accuracy of this claim, since this would take an expert timber cruiser and a survey of the market conditions to determine values.

11. Thereafter, I met Mr. Stanley A. Taylor, Swagerty's attorney, who accompanied me to the area where the accident occurred to point out the practice mine and the shell claimed to have been located at the edge of Yerkes' field. We did see the practice mine under the fence, next to Round Mountain Road, near Yerkes' gate to his south field, but were unable to locate the shell referred to. We again visited the scene of the accident to confirm the facts herein above set forth, and returned to Port Angeles.

12. I then endeavored to contact Mr. John Fuller, manager of Clallam County

Medical Service Corporation, First National Bank Building, Port Angeles, in order to obtain a copy of their contract under which the boys' hospital and doctor bills were paid and to ascertain whether it contained a subrogation clause. However, no one was in his office at any time I called there, and no copies of the contract could be obtained.

13. Considering this investigation complete, I again called on the County Sheriff to determine whether he had in his possession any real evidence which he may have picked up in the area, but he stated that he did not. Thereupon, I returned to Seattle, arriving in the Seattle District Office at 6:40 P.M., 22 September 1948.

14. It is my opinion that the two boys, Homer and Howard Swagerty, were killed by an explosive shell which they had extructed from a log they had been sawing and which they had been playing with at the time it exploded. This theory is believed to be in accord with the physical facts observed. It did not appear practicable to obtain signed statements from the witness interviewed, and their statements during questioning did not indicate any equivocation or evasiveness.

1 Incl

Exhibit I

WARREN H. PLOEGER

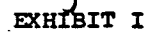
Attorney .

B-15

ATTACHMENT 1

E-4

23



ATTACHMENT 1 E-4

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
9800th TDU-24, DETACHMENT # 15
BOMB AND SIGNAL DISTRICTAL HEADQUARTERS

C-2-R-T 1-3-1-C-A-T-3

273160

7 May 1949

All lands within the Combat Target Range, situated eight miles south east of Port Angeles, Washington; comprising approximately 775 acres, have been given a careful visual inspection, and impact areas were swept by mine detectors. Dangerous and/or explosive materials were destroyed by demolition.

Due to the use of high explosives, wide dispersity of fire and roughness of terrain; it is recommended that these lands be restricted to surface use only.

Jesse F. Donovan
JESSE F. DONOVAN
CAPT. CE
COMDC.

STATE OF WASHINGTON)
) ss
County of King)

On this 11th day of May, A.D. 1949, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn personally appeared JESSE F. DONOVAN, Captain, Corps of Engineers, to me known to be the individual described in and who executed the foregoing instrument, and acknowledged to me that he signed and sealed the said instrument as his free and voluntary act and deed for uses and purposes therein mentioned.

WITNESS my hand and official seal hereto affixed the day and year in this certificate above written.

Charles M. McDonnell
CHARLES M. McDONNELL, Notary Public in
and for the State of Washington, re-
siding at Seattle

My commission expires: 21 July 1949

E-5

ATCH 3 to Incl 1 to Incl 1

Filed for record in the Department of the Army
of the State of Washington
FEB 22 1949
at... min. pub. L. P. ...
and recorded in vol. 225 of
...
ROY E. ALLFREY, ...
CLALLAM COUNTY, WASH.
47355 Est. Original by ...

27316

9800 TSU-CE DETACHMENT NO. 2
ENGINEER RANGE CLEARANCE TEAM
P. O. Box 6104, Station B
Albuquerque, New Mexico

22 September 1952

SUBJECT: Report of field trip to Port Angeles Combat Range

THRU: District Engineer
Seattle District
Corps of Engineers, U. S. Army
4735 E. Marginal Way
Seattle, Washington

TO: Office, Chief of Engineers
Building T-7
Washington 25, D. C.

1. Per instructions contained in SO 34, Southwestern Division Engineer, dated 8 September 52, the undersigned and four (4) EM reported to the Seattle District Engineer at 1000 on 11 September 52.

2. At the Seattle District office we were briefed by Lt Col Hall, Mr. Becker and Mr. Nelson and files were made available for study of the Port Angeles Combat Range.

3. At the outset, acting on information contained in reports of recent visit to the Range by Seattle District representatives, (which stated this area had not been cleared) preparations were made to clear the ten (10) acre area pointed out to us by Mr. Nelson and by Mr. Ray Peterson (owner). The area is heavily wooded and sub-irrigated with heavy wet green undergrowth which could not be burned. There are three (3) target areas each about 200 feet square at the edge of this area which contained some scrap of target tanks and a few of the trees remaining in one target area are scared. In order to dry out the area for future clearance, a ditch was dozed through the area for drainage.

4. In clearing a path for the dozer with detectors, (5 yards wide and 300 yards long through the center of the area) no scrap was found. Acting on this I initiated a search of this area and surrounding acreage during which no scrap was found. I then concluded that the report was mistaken and that the area had been previously cleared by the teams of Capt Donovan and Lt Sainato. The target areas were then swept with detectors and found to be clear. This proved that the previous job had been thoroughly done, and that further clearance action would be repetitious and wasted effort.

Subject: Report of field trip to Port Angeles Combat Range

5. I recommend however, that the "Restriction to Surface Use", which was placed on the area by Capt Donovan remain. The use of High Explosive Shells, the wide dispersion of fire and the roughness of the terrain make this necessary. The area is well posted by the Seattle District office and all owners in the vicinity are aware of the danger in the area.

6. I should like here to commend the offices of the Seattle District and the 369th Engineer Regiment at Fort Worden for their assistance and cooperation with the team on this job.

7. The Detachment is returning to Albuquerque District on 25 September 1952.



D. R. LYNCH
Capt., CE
Commanding

9800 TSN-CE DETACHMENT NO. 1
ENGINEER RANGE CLEARANCE TEAM "A"
GENERAL DELIVERY
PORT ANGELES, WASHINGTON


22 November 1955

CERTIFICATE OF CLEARANCE

PORT ANGELES COMBAT RANGE:

All lands contained within the Port Angeles Combat Range located in Sec 5 - 8 - and 17 T4 29 N R5 W W1 (approximately 1600 acres) have been given careful visual inspection. Lands of the range area as outlined above were, with the exception of 1 Plus acres in Tract A-105 located on map furnished to Seattle District Engineers, found to be clear of impact areas as defined in O and R Office Chief Engineers and are recommended for any use to which the lands are suited.

The 1 Plus acre impact area in A-105 is recommended for any above surface use to which the lands are suited.


D. E. LYNCH
Major., CE
Commanding

ATTACHMENT 3

E-7

Incl 3'

170TH ORDNANCE DETACHMENT
Fort Lewis, Washington

24 September 1956

CERTIFICATE OF CLEARANCE

This is to certify that the parcel of land designated as "hot" area in a former Army Combat Range at Fort Angeles in Clallam County, Washington was visually searched for surface explosive hazards and was searched for buried UXO down to a depth of 12 inches from the surface of the ground. Below surface search was conducted with the use of a Mine Detector Set AM/PRS-3. This clearance took place between 17 Sep to 21 Sep 1956.

The following items were unearthed in this 0.71 acre and its fringe areas:

- 26 37 mm. M51, solid rounds
- 1 37 mm. M65. HE
- 4 Rusted bodies M51 type fuze (all expended)
- 3 Rusted tail fin fragment of 81 mm mortar

Approximately 1 1/2 tons of scrap metal (mostly parts of a tank which was obviously used as a target) were gathered.

The area was searched by a team of 1 officer and 2 enlisted men from this organization. A total of 96 man-hours were utilized for this operation.

Conrado A. Garcia
CONRADO A. GARCIA
1st Lt, Ord Corps
Commanding

CERTIFICATE OF CLEARANCE

(Date)

Rec'd in Seattle District
Engineer Ofc 22 March 1957

1. The following described land within the Port Angeles Combat Range, located approximately seven (7) miles southeast of Port Angeles, Washington, has been given a careful search and has been cleared of all dangerous and/or explosive materials reasonably possible to detect.

A parcel in the $SE\frac{1}{4}SE\frac{1}{4}$ of Section 5, T. 29 N., R. 5 W., W.M., Clallam County, Washington, described as follows:

Commencing at the southeast corner of said Section 5; thence northwest forming an angle of $57^{\circ}26'10''$ with the east line of said Section 5, for a distance of 841.5 feet, to the true point of beginning; thence southwest forming an angle of $95^{\circ}44'50''$ to the left, for a distance of 125 feet; thence northwest, forming an angle of $95^{\circ}09'$ to the right, for a distance of 250 feet; thence northeast, forming an angle to the right of $84^{\circ}51'$, for a distance of 125 feet; thence southeast, forming an angle of $95^{\circ}09'$ to the right, for a distance of 250 feet to the true point of beginning; the interior angle formed by the first and last courses is $95^{\circ}09'$. The parcel contains 0.71 acres; the location of which is shown in green on the attached drawing.

2. Reconnaissance of the balance of the range and a search of records reveal that any or all of the approximately 776 acres in the range may be contaminated with explosive duds. A further search of the area could not result in a complete "free and clear" certificate of clearance.

3. In consonance with the above, it is recommended that the entire Port Angeles Combat Range within the probable limits of contamination as hachured in blue and red, and over-hachured in brown on the inclosed Drawing No. SE-RE-314, including the 0.71 acre parcel described in paragraph 1 above, be purchased by the United States Government and any subsequent use thereof limited to surface use only.

1 Incl
Drawing No. SE-RE-314


FORREST R. SPIVA
Major, Ord Corps
548th Ordnance Detachment (EOD Ccn)

ATTACHMENT 5

E-9

Incl 5

21 May 1965

SAJRD

SUBJECT: Report of Reconnaissance Inspection, Port Angeles Combat Range, Clallam County, Washington

1. In accordance with authorization in 20th Indorsement, dated 19 February 1965, from the Chief of Engineers to Division Engineer, North Pacific Division, Portland, Oregon, and in pursuance with instructions in letter, dated 6 April 1965, from the Division Engineer, South Atlantic Division to The District Engineer, Jacksonville District, copy of which was furnished the Chief of Engineers, Division Engineer, North Pacific Division, and the District Engineer, Seattle District, the undersigned reported to the District Engineer Office, Seattle District, 3 May 1965, to inspect the 652.93 acres of fee owned and easement interest land to determine whether this former artillery range should be retained by the 6th Army or reported to General Services Administration for disposal.

2. Accompanied by representatives of the Corps of Engineers, Seattle District, an inspection was made of that portion of subject range which could be traversed; however, in view of the type of terrain, the years of accumulated dead vegetation, dense undergrowth and other debris, a complete visual inspection of land described in subparagraphs 2 c. and d. could not be made.

<u>LAND CLASSIFICATION</u>	<u>PERCENTAGE OF TOTAL ACREAGE</u>
a. Agricultural type land (cleared)	9.89%
b. Agricultural type land (uncleared)	5.0 %
c. Canyon or deep ravine type land	35.0 %
d. Mountain side (nontillable) land	50.11%

3. Additional information pertaining to the above classification of lands obtained from the Assistant Superintendent, Olympic National Park, disclosed that approximately 97% of the land in Clallam County, Washington, is mountainous or timbered. The remaining 3% is cleared farm type land, 2% being farmed in The Sequim Area and 1% being utilized as improved pasture land. The undersigned was, also, informed that the average rainfall in the immediate vicinity of subject range is 24.61 inches per year and that the water shed is in a northward direction to the Port Angeles Dam (shown circled in blue on attached map) from which the City of Port Angeles obtains the greater portion of its requirements.

4. Inspection of the cleared or farm land, consisting of 66.0 acres, disclosed that the highest and best use is for agricultural purposes but due to the restrictions to surface use only, placed on the entire range

Incl 1 to Incl /

area (652.93 acres) in the Certificate of Clearance, prepared by the Commanding Officer, 9800th TSU-CE Detachment No. 15, dated 7 May 1949, and recorded in the public records, Volume 225 of Deeds, page 235, Clallam County, Washington, the recommended use of the 66.0 acres is limited to grazing of livestock and/or reforestation of timber.

5. The mountain and canyon areas, consisting of approximately 85% of the total acreage, is sparsely covered with second growth timber of merchantable size, namely, Douglas and Pacific Fir, Hemlock, Alder and Cedar; however, due to the possibility that the merchantable size timber may contain metal from this firing range and because of the enormous supply of noncontaminated timber accessible to mills from other sources, very low prices were quoted the undersigned for timber from this range area. Pulpwood in general, "Alder", in sizes from six inches up, was quoted at \$3.00 per cord; saw timber averaging \$15.00 to \$20.00 per thousand.

6. Inspection, also, disclosed that there are two (2) wood frame buildings on subject range; one (1) being a two story dwelling located on the east side of Deer Park Road and the other a small barn type structure on the west side of said road. Both are in very poor condition. The agricultural land shown in green on attached map is fenced in part; however, the fencing is in poor condition.

7. Audited Map No. 4185, Port Angeles Combat Range Military Reservation, complete with Legend showing classification of lands, is attached. Also, attached is a suggested sketch of warning signs used by the South Atlantic Division for posting the perimeter of lands on which restricted use was recommended upon the completion of deduidding operations.

8. GENERAL SUMMARY

After having completed the inspection of subject range and a review of reports of previous inspections made by qualified Explosive Ordnance Detachments (EOD) personnel, it is the opinion of the undersigned that:

a. Port Angeles Combat Range did not receive a high concentration of explosive projectiles, nor is it contaminated to the extent that it requires fencing.

b. All restricted areas should be inspected annually for a period of three (3) years. During this period, if no explosives are found or reported to the District Engineer, inspections may be discontinued; however, if explosives are found, the annual inspection should be continued.

c. In the interest of safety to the general public, warning signs should be posted and legibly maintained on the perimeter of all lands on which restricted use has been recommended by the Government.

9. RECOMMENDATIONS:

In view of the restricted use of subject range, its topography, size and remoteness to other military bases, it is recommended, if the Department of the Army does not have any foreseeable requirement for the property, that it be reported to General Services Administration for disposal, subject to the recommended restricted use as outlined in the Certificate of Clearance, dated 7th day of May 1949, and with a reservation of rights to the United States to post the perimeter of the contaminated range area with signs of warning to the general public and to inspect the area as stated in paragraph 8 b. above.

3 Attachments

1. Range Map
2. Sketch
3. Certificate of Clearance,
dated 7 May 1949

John B. Campbell
JOHN B. CAMPBELL
Range Clearance Officer
South Atlantic Division

Dated: 21 May 1965



DANGER



YOU ARE ENTERING AN AREA FORMERLY USED
AS A MILITARY FIRING RANGE. UNEXPLODED
BOMBS OR SHELLS MAY REMAIN IN THIS AREA.

SHELLS AND BOMBS ARE DANGEROUS,
DO NOT HANDLE

IF FOUND PLEASE MARK EXACT LOCATION AND IMMEDIATELY
FURNISH ALL INFORMATION TO:

THE REAL ESTATE DIVISION, U.S. ARMY, ENGINEER DISTRICT,
SEATTLE, CORPS OF ENGINEERS, P.O. BOX
SEATTLE, WASHINGTON

add 2 to Serial 1

ATCH 2 to Incl 1 to Incl 1

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR THE FORMER
PORT ANGELES COMBAT RANGE
PORT ANGELES, WASHINGTON
PROJECT NUMBER F10WA003301

APPENDIX F

LETTERS/MEMORANDUMS/MISCELLANEOUS ITEMS

APPENDIX F

LETTERS/MEMORANDUMS/MISCELLANEOUS ITEMS

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- F-2 Memo discussing Range Specifications, 1943 (B-38)
- F-3 Memo/affidavits of contamination of Little property, 1954 (B-39)
- F-4 Memo discussing of lands previously part of range, 1954 (B-40)
- F-5 Memo of Final Audit of site, 1960 (B-41)
- F-6 Memo recommending range land be excessed, 1965 (B-42)
- F-7 Memo noting discrepancy of land restriction on deed of Raymond Diehl, 1989 (B-43)
- F-8 TO&E for 115th Cavalry from Patton Museum (B-44)

HEADQUARTERS SECOND SQUADRON
115TH CAVALRY (LTCZ)

Port Angeles, Wash.,
13 March 1943

SUBJECT: Combat Range, Request for.

TO: Commanding Officer,
115th Cavalry (LTCZ),
Fort Lewis, Wash.

1. Request the tract of land shown on the attached map sketch be leased for Combat Range in accordance with letters Headquarters SMS, WDC, (353(G-3) dated February 16, 1943.

2. The land requested lies in Sections 4, 5, 8, 9 and 17 of Township 29N, range 5 W.S.M.

3. The following additional information is submitted:

- a. Sketch attached - all land privately owned.
- b. The following list of owners is submitted for convenience.

E.O. Nordstrom, Port Angeles, Washington.

S.E. $\frac{1}{4}$ of N.E. $\frac{1}{4}$ of Sec. 5, Twn. 29N Range 5, W.S.M.

J. B. Yerkes, 1715 E. 45th Street, Seattle, Washington.

N.E. $\frac{1}{4}$ of S.E. $\frac{1}{4}$ of Sec. 8, Twn. 29N Range 5, W.S.M.

David C. Reid, Box 366, Port Angeles, Washington.

S.E. $\frac{1}{4}$ of N.E. $\frac{1}{4}$ of Sec. 5, Twn. 29, Range 5, W.S.M.,

and N.E. $\frac{1}{4}$ of N.E. $\frac{1}{4}$ of Sec. 8, Twn. 29, Range 5, W.S.M.

Milwaukee Land Company, White Henry Stuart Bldg.,

Seattle, Washington. All of Sec. 8, Twn. 29N Range

5 W.S.M., and N.E. $\frac{1}{4}$ and S.E. $\frac{1}{4}$ of Sec. 9, Twn.

29N, Range 5, W.S.M.

Collier Mill Company, Port Angeles, Washington.

Sec. 9 and 17, Twn. 29-5.

Frank Miller and James Reid, Port Angeles, Washington.

Sec. 17, Twn. 29-5.

Shelton County, Port Angeles, Washington.

Sec. 1, Twn. 29-5.

Poor Quality
Original

- c. The range will afford suitable terrain for firing all weapons of the Cavalry Mechanized Squadron and will be used for tactical firing problems and short range known distance firing (200-300 yds) Class A.
- d. Safety limits are as prescribed in AR 775-10.
- e. No construction contemplated.
- f. No materials required.
- g. No cost of construction.

FRITON S. DAVIS
Major, 115th Cav (Mech)
Commanding

1st Ind.

HEADQUARTERS, 115TH CAVALRY (MECH), Fort Lewis, Washington, March 15, 1943.

To: Commanding General, Northeastern Sector, Western Defense Command,
Fort Lewis, Washington.

Approved.

For the Commanding General:

JACK E. DUNN
1st Lt., 115th Cav (Mech)
Assistant G-3

Poor Quality
Original

HEADQUARTERS
1331 ENGINEER COB AT WASHINGTON
Fort Lewis Washington

1 April 1943

Subject: Combat Range at Port Angeles.

To: Commanding Officer, 1331 Engineer Combat Battalion, Fort Lewis, Washington.

1. The site of the proposed combat range for the 115th Cavalry at Port Angeles, Washington was visited 31 March 1943. This appears to be an excellent site for the purpose. Safety requirements of AR 700-10 will be complied with. No anti-aircraft firing will be done at this range. Terrestrial fire only is approved.

2. Pertinent data in regard to this site:

- a. Location of firing line:
Longitude - $123^{\circ} 20' 30''$ West
Latitude - $48^{\circ} 02' 00''$ North
- b. Direction of fire: due south to south 17° West (Azimuth right $160^{\circ} - 170^{\circ}$)
- c. Air line distance to nearest town: 51.5° W to Port Angeles, Washington.
- d. Vertical coordinates of fire will be supplied in a separate report by the 115th Cavalry.

3. All land covered by the danger area (see attached overlay) should be acquired. In addition, that of A. G. Hardestrum, Port Angeles, Washington should be included as this is the most satisfactory approach to the firing points and greatly increases the effectiveness of the range for combat training.

/s/ Gen. H. H. Hines
Commanding Officer
1331 Engineer Combat Battalion
Fort Lewis, Washington

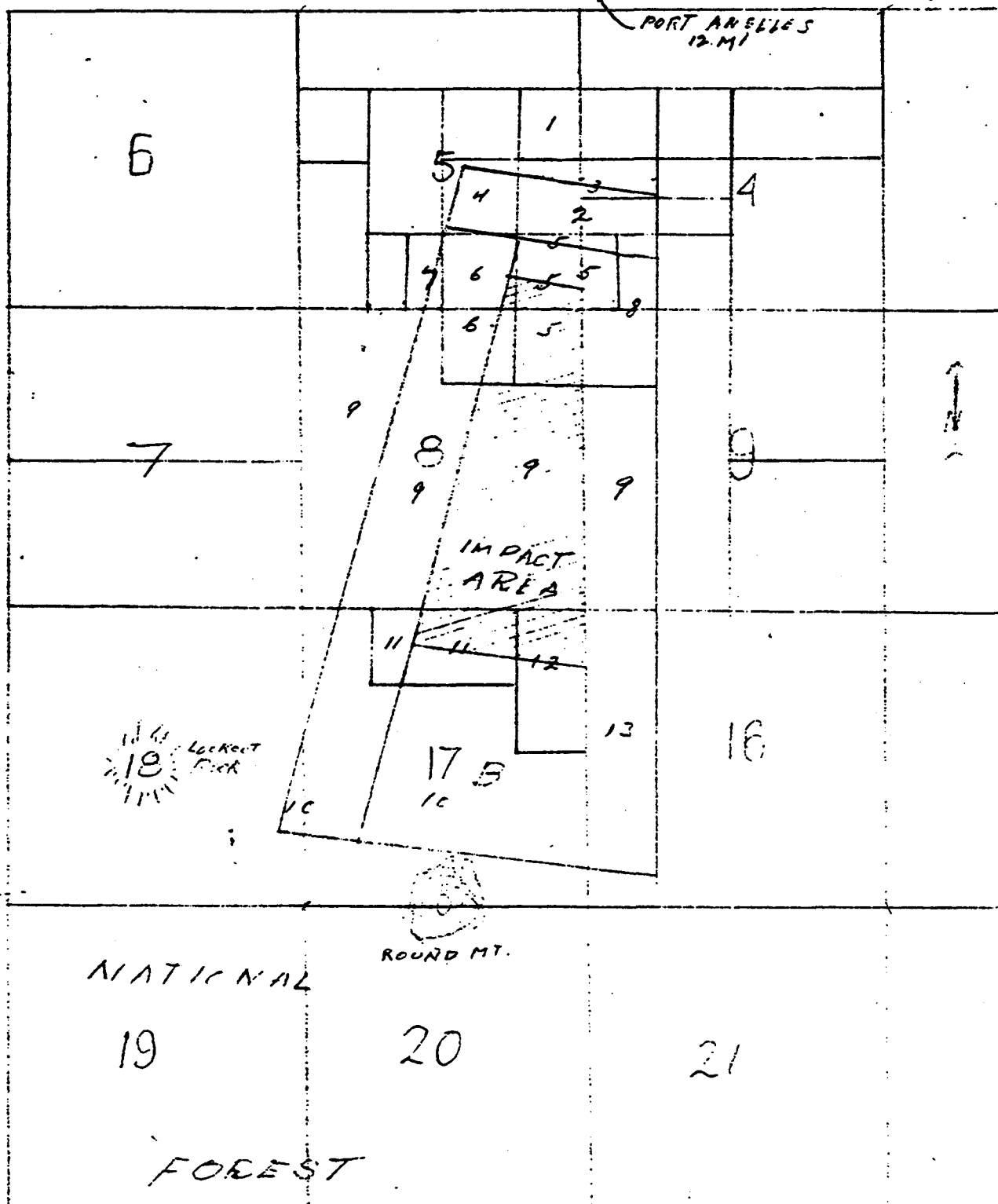
Encs:
1 overlay

Poor Quality
Original

TOWNSHIP 29N., RANGE 5E. 11M CLALLAM COUNTY - WASH.

COMBAT RANGE - 75MM & 37MM & SMALL ARMS

SCALE 2 IN = 1 MI



- | | |
|---------------------|-----------------------------|
| 1. J. W. SCHIER | 8. H. C. BRAVEHAW. |
| 2. J. E. YERKES | 9. MILWAUKEE LAND CO. |
| 3. C. L. GILBERTSON | 10. OLYMPIC NATIONAL PARK |
| 4. J. A. OLSEN | 11. OLYMPIC NATIONAL FOREST |
| 5. DAVID C. REID | 12. JAMES S. REED |
| 6. FRED. MAERHNER | 13. STATE OF WASHINGTON |

F-2

EXHIBIT 1. PORT ANGELES

COPY

FILE : 153(Port Angeles Combat Range, Claim No. S-1255, Elbert J. Little)NPSRO
TO : Chief, Appraisal Branch DATE: 15 February 1954
FROM : Chief, Acquisition Branch
SUBJECT: Request a 'Before and After' Appraisal of Little Property

1. Claim has been presented by Elbert J. Little for loss in market value of his land, being the southeast quarter of the northeast quarter, Section 5, Township 29 North, Range 5 West of the Willamette Meridian, in Clallam County, resulting from its supposed restriction to surface use following its lease in 1943-44 in connection with the Port Angeles Combat Range. Our investigation and official records indicate that the tract was leased as "the most satisfactory approach to the firing points", which were located on land to the south; but that its use for access was not feasible because the bridge across the creek on the land was not strong enough to support the mechanized equipment. Our investigation and the records also indicate that all firing was in a southerly direction from the firing points.

2. However, the drawing attached to the certificate recommending restriction to surface use was somewhat ambiguous in indicating the contaminated area, and letters of warning were sent by our Management and Disposal Branch to all lessors and permitors within the "take" line, including Little, as indicated by the claimant's letter of 26 October 1953, copy attached. On the basis of these letters, along with the filing of record on 26 February 1953 of the ambiguous drawing (which was replaced by a clarifying drawing on 14 August 1953) the land owner takes the position that there has been a diminution in market value of his property.

3. For your information, copies are attached of statements secured from David C. Reid, Anna F. Pelikan, and the claimant, as well as a copy of memo for the files of Anne O. Gibbons in connection therewith. Please return these copies when they have served your purposes.

4. Will you please provide a "before and after" appraisal of the Little property for the guidance of the Condemnation and Claims Section in passing on the claim. The Littles, we understand, purchased the land in 1947 and moved on it in 1948.

/s/ AFS
STRAUB

5 Incl

1. Cpy ltr dtd 26 Oct 53
2. Cpy statement of Reid
3. Cpy statement of Pelikan
4. Cpy statement of Little
5. Cpy Memo of Gibbons

EXHIBIT P
COPY

COPY

602(Port Angeles Combat
Target Range, Wn.)NPSRM

Mr. and Mrs. E. J. Little
c/o Herman Pilikan
Route No. 2
Port Angeles, Washington

MAR 5 1953

Dear Mr. and Mrs. Little:

You are of course aware of the use by the Army of some 1,000 acres of land in Clallam County, Washington, near Port Angeles, prior to 1944 as an Army Combat Firing Range. Also it is believed that you are in full possession of the facts of the release by the Army of this range in 1944 and the subsequent discovery some four years later of its contamination by explosive material.

Under your written permission of 20 September, 1948, the Department of the Army undertook to clear all of the explosive material from this suspect area and a uniformed team of Bomb and Shell Disposal Specialists searched the area, including your property, and destroyed such unexploded ammunition as could be found.

Upon the completion of this dedudding mission, the Officer-In-Charge on 7 May 1949 executed a Certificate, as to the condition of the land which his organization has searched, and recommended that these lands be restricted to surface use only. A certified copy of this Certificate with a Real Estate Map attached is inclosed for your information. It was placed of record in Clallam County Court House, 26 February 1953, Recording No. 273166. It may be added that an inspection of the suspect area of this former Army Combat Range was made late in 1952 by another Uniformed Team of Bomb and Shell Specialists with the result that the 1949 certification, by Captain Donovan, was confirmed.

This notice is furnished you in order that you may have complete information of the recommended restriction of use of lands in this area and the Certificate was recorded as permanent notice to all present owners and subsequent purchasers.

Very truly yours,

/s/ LLOYD L. RALL
Lt. Col., Corps of Engineers
Executive Officer FOR
N. A. MATTHIAS
Colonel, Corps of Engineers
District Engineer

1 Incl:
Certificate w/att

EXHIBIT H

COPY

REGISTERED

Statement of Albert J. Little, address Route 2, Box 161, Pt./
Angeles.

I bought the land, being the SE quarter of the N. E. quarter of Section
5-29-54, in October 1947, shortly before the boys were killed, and
still own it. Early ^{in the} last summer of 1952 I was going over the ground
at the northeast edge of the south clearing with a harrow, when something
hard caught the blades. I dug about 3 or 4 inches and found several
pieces of shrapnel, or fragments of a shell, well rusted. The clearing
in question is my hay land, but it has pretty well run out. It was
formerly planted to clover and some alfalfa. Since finding the shrapnel,
I have not attempted to plow or harrow any of my land. ~~since then~~
Hanthen

I bought the place from ~~Aspenes~~ my father-in-law, Herman Pelikan,
told me the clearing had been re-seeded about 3 years before I bought
it, and from the looks of the clover I would say this was about right.
I have indicated on the map attached the approximate place where I
found the shell fragments.

/s/ Albert J. Little
2-4-1954

Witness:

/s/ Anne G. Gibbons

EXHIBIT L
COPY

My name is Anna F. Pelikan, P. O. Box 764, Pt. Angeles, Wn. My husband, Steve Pelikan and I have lived on the NE^{1/4} NE^{1/4} Section 5-29-54. for many years prior to 1943 and up to the present time. At the time the Army was using the Port Angeles Combat Range, we had plenty of opportunity to see how they operated. At no time to my knowledge was any use made of the Schier property, now owned by Elbert J. Little. The target tank was on the Peterson land (formerly Yerkes) south of the Little line, where there was a row of trees. All firing was to the south. Mr. Pelikan and I cut hay in the clearing on the south side of Little's property during the time the firing was going on. The Army did not use the road on Schier's place, because the bridge across the creek was not strong enough. The / ^{main AOG} road was usually closed from the line between Peterson and Little south, and the Army would notify the few people using the road when it was alright to come through. The road that was used for access to the firing range was the school-house road.

/s/ Anna F. Pelikan

Febr. 4th 1954.

Witness:

/s/ Anne O. Gibbons

EXHIBIT M

COPY

Statement of Dave C. Reid, 322 East Boulevard, Port Angeles. I was the owner of property in Sections 5, 8 & 4-29-5W. before the Army took possession in 1943. The land was turned back to us later, but we never moved back, as it was too much of a job to get it in shape again.

I sold it to Yerkes in about 1945 - 100 acres in all, - for \$4500. Just after the Army took over we were offered \$6000 for our land by Dr. J. C. Hay, who now lives in Ellensburg. - D. C. R.

The observation tower shown on the map was south of the line of Little's property, in the northwest corner of the 40 that Yerkes then owned in Section 5. I was only on the land once during the time firing was going on, to pick raspberries near the house. I was told by Captain Cardon and Major Davis (I think) that they were firing in a southerly direction - that they had placed the target where fire that didn't hit it would go onto Government land to the south. One of the tanks - A.O.C. targets was located on Yerkes 40 and one on ours, but the one on Yerkes property showed little or no use. There were also many smaller targets - logs, dunnies, etc., on our land. Once, after the 115th Cav. left, I was out to the range with the State Guard for firing practice. We fired to the south only, on the order of our officers.

/s/ David C. Reid

Witness:

Anne G. Gibbons
Feb. 4, 1954

EXHIBIT N
COPY

MEMORANDUM FOR: Files

FROM: Anne O. Gibbons, Chief, Condemnation and Claims Section

SUBJECT: Statement of Elbert J. Little

1. By appointment made by telephone the evening of 3 February, I arrived at the Little home shortly before 9 A.M. on 4 February. In the course of questioning Mr. Little, he offered to show me the "shrapnel" found on his land. This material, which he secured from a room or alcove adjoining the living room, consisted of three or more pieces of rusted metal, which he carried in his two hands. I did not examine the pieces, but got the impression that there was considerably more metal than Little had shown Edward F. Zimmerman a few months ago, which Zimmerman described as "part of a shell apparently 3 or 4 inches in diameter," and which Zimmerman says consisted of a single piece, 7 or 8 inches long.

2. When I asked if Mr. Little would mind if I wrote down his statements and had him sign them, he seemed to hesitate an instant and then agreed. When asked when he had found the material, he said "early last summer." Mrs. Little interrupted to say that it was earlier than that, because it was before some other event connected with the claim - I didn't catch what. Little then said it must have been the previous year - 1952 - and I changed the statement to show this and had him initial the correction.

10 February 1954

AOY
ANNE O. GIBBONS
Chief, Condemnation and Claims Section

EXHIBIT 0



DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON 25, D. C.

IN REPLY REFER TO

601.53 Port Angeles, Washington
ENGLS

6 DEC 1954

SUBJECT: Acquisition of Land, Port Angeles Combat Range, Washington

TO: Division Engineer
North Pacific Division
Corps of Engineers
Portland, Oregon

1. Reference your 9th Indorsement dated 18 October 1954, file MPD 601.1 (Port Angeles Combat Range, Washington), subject: "Request for Authority to Submit Planning Report", concerning the subject range.

2. Authority is granted to lease those areas of privately-owned land in the Port Angeles Combat Range as described in the Real Estate Planning Report accompanying the above-mentioned 9th Indorsement and which cannot be released for unrestricted use, at a rental not exceeding \$10,000 for the first year and \$5,000 per annum thereafter.

3. It is noted that the Real Estate Planning Report does not recommend the leasehold acquisition of improvements on Tracts A-104 and A-106. Since these Tracts are comparatively small, and since it appears from comments in the Planning Report that it is contemplated that the owners of these properties will continue occupying the improvements thereon, it is requested that a redetermination be made as to the necessity of leasing the underlying fee to these particular Tracts. It is assumed that the land upon which the improvements are situated will not be included in the lease.

4. It is requested that the leases be made automatically renewable annually for an indefinite period but with right of cancellation by the Government at any time with 30 days notice, and provide for option to purchase the property at its current fair market value with the rentals applying to the purchase price. In this connection, action is being initiated by this office to obtain authorization and appropriation to acquire fee title to the properties.

5. The negotiation of the leases will be contingent upon the lessors' withdrawing any existing claims against the Government and releasing the United States of all future claims arising out of the use and

601.53 Port Angeles, Washington

6 DEC 1954

ENGIS

SUBJECT: Acquisition of Land, Port Angeles Combat Range, Washington

occupancy of the properties. It is requested that action be taken for the proper posting of the area, and other appropriate means considered necessary for restricting public access thereto.

BY COMMAND OF MAJOR GENERAL STURGIS:



Chief, Acquisition Division
Real Estate

U. S. ARMY ENGINEER DISTRICT. SEATTLE
CORPS OF ENGINEERS
1519 SOUTH ALASKAN WAY
SEATTLE 4. WASHINGTON

ADDRESS REPLY TO
DISTRICT ENGINEER
(NOT TO INDIVIDUALS)

REFER TO NPSRC
Final Audit
Port Angeles Combat Range, Wash.

5 January 1960

SUBJECT: Final Audit of Land Records re: Port Angeles Combat Range,
Washington

TO: Division Engineer
U. S. Army Engineer Division, North Pacific
Portland, Oregon

1. Pursuant to instructions from the Chief of Engineers, the final audit of land records has been completed. The Tract Register, Statement of Outstanding Rights, and a reproducible print and two ozalid prints of the Final Project Map are inclosed for the Chief of Engineers.

2. One copy of each of the above inclosures is transmitted for the Division Engineer.

3. Copies of RE-D Unnumbered (Gen'l) dated 6 December 1954, RE-D Unnumbered (Gen'l) dated 20 October 1955, and Easement and Final Certificate of Title covering Tract A100E are transmitted for the Chief of Engineers.

4. This installation was used during World War II under leases, Permit Forms 280 and Permit Forms PDRE 124 for a firing range. In April and May 1944 the range was declared excess and the instruments terminated. Reacquisition of land by lease was authorized by the Chief of Engineers on 6 December 1954. Fee title to Tract A102 containing 80 acres was vested in the United States by judgment and decree entered 17 September 1956 in Case No. 3963 in case captioned Fred W. Machenheimer et ux -vs- United States of America. Payment of the award was made by the Department of Justice from a fund available to that office.

5. Tract A105 is the subject of a civil action entitled Ray H. Petersen et ux -vs- United States of America, Civil No. 4729, filed 21 November 1958. Claims assembly No. S-1251 gives the facts upon which the action is predicated.

(6)
NPSRC

5 January 1960

SUBJECT: Final Audit of Land Records re: Port Angeles Combat Range,
Washington

6. Tract A104 was included in Claim No. S-1253. Payment in the amount of \$8,675 was made in settlement of the claim on 16 August 1957.

7. Tracts A106 and A107 are included in Claim No. S-1254. Approval of award to claimant in the amount of \$7,100 was recommended by 5th Indorsement from the Division Engineer, North Pacific Division to ENGLU dated 7 July 1958.

8. Claim No. S-1255 was recommended for payment by this office in the amount of \$300 for damages due for crop loss. The land involved was outside the probable limit of contamination but due to misinterpretation of a map filed in the County records, the claimant refrained from tilling the soil of his cleared land for one year. Recommendation for payment was forwarded by this office to the Division Engineer, North Pacific Division, on 26 August 1954.

9. It is requested that the inclosures submitted be approved by the Chief of Engineers and Audited Installation Number assigned.

FOR THE DISTRICT ENGINEER:

4 Incls

1. Tr Reg (in dupe)
2. Stmt of O/R (in dupe)
3. Final Proj Map (in quad)
4. Acqn Doc (4 sets)


W. M. TRUESDELL
Chief, Real Estate Division

NPDRC (5 Jan 60) 1st Ind
Final Audit - Port Angeles Combat Range, Washington
SUBJECT: Final Audit of Land Records re: Port Angeles Combat Range,
Washington

U. S. Army Engr Div, North Pacific, Portland, Ore 14 Jan 60

TO: Chief of Engineers, DA, Washington, D.C.
ATTN: ENGLH

1. The inclosed final audit assembly has been reviewed and is forwarded for the approval of your office.
2. The discovery of live ammunition on the former combat range after completion of disposal and the subsequent inspection of the land by deduinding teams resulted in a portion of the area being declared unsafe and restricted to surface use only. This action resulted in the filing of several claims against the Government for alleged loss in value of property. The contaminated area was authorized for reacquisition by lease on 6 December 1954 and acquisition in fee has been recommended.
3. With regard to Claim No. S-1254, which included Tracts A-106, A-107 and A-108, payment of \$7100 to Edith Yerkes was approved by the GAO and a voucher in this amount was forwarded the Seattle District for payment on 21 October 1958. Division Office records do not contain record of settlement of Claim No. S-1255, which claim was forwarded GAO through Chief of Finance by this office on 15 September 1954 recommending payment of \$300 only for crop loss. Claim filed by the Milwaukee Land Company, owner of Tract A-101, for alleged damage to growing timber, and claim filed by Ray H. Petersen, owner of Tract A-105, are outstanding at this time.
4. It is requested that the District Engineer, Seattle District, and this office be informed with respect to approval of the attached assembly and the assignment of an audited installation number thereto.

FOR THE DIVISION ENGINEER:

4 Incl
n/c
1 cy ea Incl 1, 2 & 3 w/d
(Incl 3 under separate cover)


A. L. DOUGLAS
Chief, Real Estate Division

ENGRE-PR (5 Jan. 60)

2d Ind

SUBJECT: Final Audit of Land Records re: Port Angeles Combat Range,
Washington

Hq, DA, OCoEngrs, Washington 25, D. C. OCT 20 1960

TO: District Engineer, U. S. Army Engineer District, Seattle,
Seattle, Washington

1. The final audit assembly forwarded by preceding indorsement is approved. However, prior to approval the Authorization Block on all audit elements has been revised to reflect the following: "(Tucker Act) 28 U.S.C., 1346(a)(2), dated 17 Sep. 1956", for the taking of 80.00 acres, fee. The date referred to herein is the date of Judgment and Decree (see paragraph 6d(2), EM 405-1-200).
1050).

2. Port Angeles Combat Range, Washington, has been assigned Audited Installation Number 4185.


3. It is requested that the real estate records in the Seattle District and North Pacific Division offices be noted accordingly.

4. It is also requested that the date of final opinion for Tract A-102 be furnished when available.

5. A copy of the Jurisdiction Summary of subject installation is forwarded for incorporation into the real estate records of the Seattle District.

FOR THE CHIEF OF ENGINEERS:

1 Incl
wd Incls 1 thru 4
Added 1 incl
5. Cy Juris. Summary


K. E. GRENWIS
Assistant, Programs Control Div.
Real Estate



DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, SEATTLE
CORPS OF ENGINEERS
1519 ALASKAN WAY SOUTH
SEATTLE, WASHINGTON 98134

IN REPLY REFER TO

NPSRE-MD

28 June 1965

SUBJECT: Recommendation of Excess, Port Angeles Combat Range, Washington

TO: Division Engineer
U. S. Army Engineer Division, North Pacific

1. Reference is made to letter dated 6 April 1965, from SADRМ to SAJRM, subject: Range Inspection, Port Angeles Combat Range, Washington. As directed by your subsequent 6th Indorsement dated 16 June 1965, pursuant to approval contained in 4th Indorsement dated 9 June 1965, from ENGRE-MC to SPIRM, a report of excess is submitted in accordance with paragraph 4, Change 2 to AR 405-90 for subject range.

a. The Port Angeles Combat Range is located about eight miles southeast of Port Angeles, Clallam County, Washington, on the Olympic Peninsula. It is comprised of 652.93 acres acquired at an original cost of \$34,611. and is shown on real estate drawing SE-RE-314 attached.

b. The only improvements existing are an old four-strand barbed wire fence, a two story dwelling and a small barn type structure, all of which were in dilapidated condition when acquired in 1962. Location of the wood frame buildings is shown on the attached drawing. The small piece of fencing borders along Deer Park Road. All improvements are situated in Tract A-105 on the drawing.

c. This property is a part of the original range leased from private owners and used for combat target training in connection with 75 and 37 MM weapons and small arms during 1943-44. Both high explosive and armor piercing live ammunition were used in the training. In April 1944 the area was declared surplus to Army's needs and disposal action was taken of the Government held leasehold interests in the privately owned lands. This disposal did not include decontamination nor inspection to determine the necessity for dedudding. In 1948 two small boys were killed in the area by unexploded materiel which resulted in subsequent practicable dedudding. As a result of later inspections, it was determined that the range may be contaminated with explosives and recommended that the range within probable limits of contamination be purchased in fee by the Government and any subsequent use thereof be limited to surface use only. The suspected probable area of contamination was subsequently purchased and has been in possession of the Government with no active use being made except for protection to the public.

~~CONFIDENTIAL~~
~~TOP SECRET~~

Incl 1

F-6

28 June 1965

SUBJECT: Recommendation of Excess, Port Angeles Combat Range, Washington

d. The United States has fee ownership in 627.93 acres of the land and an easement interest over 25 acres for 30 years from 31 October 1955. Acquisition of these interests by tracts is more particularly shown in "Remarks" of the Acquisition Tract Register on the accompanying map drawing.

e. The property is immediately available for excess.

f. There are no contractual commitments affecting disposition.

g. There are no auxiliary facilities involved and it is recommended that the property be reported to General Services Administration for disposal as soon as practicable, subject to conditions stated in paragraph 9 of the inclosed Report of Reconnaissance Inspection dated 21 May 1965 by John B. Campbell, Range Clearance Officer, SAJRD.

h. There are no commitments to other agencies which might affect disposition. The property is being screened under expedite procedures with other Department of Army and defense departments concurrent with this submission.

i. No neutralization work is necessary because the property will be reported for disposal subject to the restricted use as outlined in the Certificate of Clearance dated 7 May 1949, and reserving to the United States the right to inspect and post warning signs as referenced in paragraph 9 of the inclosed Report of Reconnaissance Inspection. A copy of this Certificate of Clearance is inclosed with the referenced Report of Reconnaissance Inspection. This certificate resulted and was issued after the two fatalities in 1948, when the services of a deduinding team were requested and worked the area from 1 October 1948 to 31 January 1949, sweeping cleared fields with mine detectors, clearing and sweeping the known impact areas, and cutting down timber in the less contaminated areas which appeared to contain projectiles. The following further history of decontamination actions is furnished for information.

(1) Upon receipt of a letter dated 13 May 1952 from an attorney representing one of the property owners, indicating that his property had not been inspected in the previous deduinding operations, another inspection was requested. Report of inspection dated 22 September 1952 (inclosed) states that the particular portion of ten acres (in the SW $\frac{1}{4}$, SW $\frac{1}{4}$, Section 4) was searched thoroughly and no scrap was found. The target areas were swept with detectors and stated to be clear. It was concluded by the detachment commander that the previous job had been accomplished thoroughly, that further clearance action would be repetitious and wasted effort, and he recommended retention of the "Restriction to Surface Use" status.

NPSRE-MD

28 June 1965

SUBJECT: Recommendation of Excess, Port Angeles Combat Range, Washington

(2) Letter dated 3 February 1955 from the Office, Chief of Engineers, ENGLS, subject: Acquisition of Land, Port Angeles Combat Range, Washington, forwarded copy of letter from the Deputy Chief of Staff for Logistics, in which Sixth U.S. Army was requested to decontaminate and return to unrestricted use as much of the range land as possible. As a consequence, another inspection was made 11 to 21 November 1955. The inclosed Certificate of Clearance dated 22 November 1955 states that the lands in the range (except one acre in Tract A-105) were found to be clear of impact areas and recommended for any use to which the lands were suited. Inspection was visual.

(3) Acting on instructions contained in letter from the Ordnance Officer, Sixth U.S. Army, 22 August 1956, subject: Operations Instructions No. 4-56, the above referenced one acre was reinspected 18-21 September 1956. Inclosed copy of report dated 24 September 1956 indicates visual and mine detector inspections, with report on projectiles and scrap located in the search. No recommendations as to future use of the land was made.

(4) The Certificate of Clearance dated 22 November 1955 (referred to in subparagraph (2) above) was forwarded to Office, Chief of Engineers, through Corps of Engineers' channels. In 5th Indorsement dated 8 May 1956, to letter, NPSRM, this office, 20 July 1962, subject: Port Angeles Combat Range, Washington, the Office, Chief of Engineers, ENGLM, stated that the placement and renewal of 40 warning signs on these lands could not be reconciled with the statement that they were safe for any use as stated in the Certificate. As a consequence, Sixth U.S. Army was requested to inspect, decontaminate, and furnish a clear and final certificate. Inspection was made during the week of 28 January 1957. The inclosed undated certificate, received 22 March 1957 from Sixth U.S. Army, states that the entire range was given a careful search and cleared of all materials reasonably possible to detect. It recommended purchase of the lands and subsequent use thereof be limited to surface use only. In forwarding the Certificate, Sixth U.S. Army stated in its 21 March 1957 letter that a further search of the entire area could not result in a complete "free and clear" certificate of clearance.

j. No cemetery is involved.

k. By staff appraisal, the estimated value of the property is not in excess of \$50,000, but greater than \$25,000.

l. Except for the recent special inspection conducted by Mr. Campbell (3445) the usual annual operation and maintenance cost is \$100 for inspection and posting of warning signs, all from regular Army O&M funds.

NPSRE-MD

28 June 1965

SUBJECT: Recommendation of Excess, Port Angeles Combat Range, Washington

m. No personnel will be laid off resultant from this disposal, as care and custody work is performed by the local Surplus Facilities Officer in conjunction with his routine duties.

n. The property does not involve an industrial installation.

2. Inclosed pursuant to the preceding is ENG Form 2187 to reflect proposed disposition. Data required by EM 405-3-905 and wire message ENGREG-2083 (242058Z December 1963) is incorporated in the ENG Form 2187-R. The following additional information required by EM 405-3-905 and wire message ENGREG-MD-1414 (162240Z May 1963) is also provided:

a. Copies of the most recent Real Estate Utilization Inspection Report made 13 July 1961, are inclosed. The next inspection based on the five-year cycle was scheduled to be made during 1966.

b. There are no outgrants in effect on the excess area.

c. There are no military activities housed on the property to be disposed of.

d. No Government employees will lose employment because of this disposal.

e. To our knowledge, local Congressional delegations have not been notified of the intended disposal and we have issued no press releases.

f. There are no major military installations within a twenty-mile radius.

3. As directed by references stated in preceding paragraph 1, it is recommended that approvals of the Deputy Chief of Staff for Logistics and the Assistant Secretary of Defense (I&L) be obtained for this proposed disposal. Upon receipt of advice from the Chief of Engineers of the latter approval, the property will be promptly reported to General Services Administration for disposal subject to conditions as discussed in paragraph 1.g. above.

FOR THE DISTRICT ENGINEER:

C. C. Templeton

C. C. TEMPLETON
Acting Deputy District Engineer

- 7 Incl (quad)
1. Rep of Rec Insp 21 May 65
w/incl
2. Rep of Insp 22 Sep 52
3. Cert Clrnce 22 Nov 55
4. Rep 24 Sep 56
5. Undated Cert (Mar 57)
6. ENG Fm 2187-R
7. Util Rep 13 Jul 61

NPDRE-MD (28 Jun 65)

1st Ind

SUBJECT: Recommendation of Excess, Port Angeles Combat Range, Washington

U. S. Army Engr Div, North Pacific, Portland, Ore., 30 June 1965

TO: Chief of Engineers, ATTN: ENGREG-MI

1. Basic letter with supporting Inclosures 1 through 5 constituting report of excess in accordance with paragraph 4 of AR 405-90 with respect to subject former range is forwarded pursuant to the concurrence of your office in this action as set forth in 4th Indorsement, ENGREG-MC, dated 9 June 1965 to basic letter of the South Atlantic Division, dated 6 April 1965, subject: "Range Inspection, Port Angeles Combat Range, Washington."

2. This former range was acquired pursuant to the acquisition authorizations set forth on the attached drawing SE-RE 314, Audited Installation No. 4185, under the circumstances and for the reasons outlined in paragraph 1c of basic letter. The range is restricted to surface use only by the recorded Certificate of Clearance dated 7 May 1949, attached to Inclosure 1 and has been retained since acquisition by the Corps of Engineers under custody and accountability of the U. S. Army Engineer District, Seattle.

3. Based upon report of recent reconnaissance inspection of the range by John B. Campbell, Range Clearance Office of the Corps of Engineers, attached as Inclosure 1, and consistent with Corps policy to dispose of lands restricted to surface use only subject to this restriction; it is recommended that this report be referred to DCSLOG, Department of the Army, for approval of excess and authority to proceed with disposal action as outlined in paragraph 9 of Inclosure 1.

4. Screening, pursuant to EM 405-1-904 in accordance with expedite disposal procedures, has been initiated and teletype report of results will be forwarded your office pursuant to paragraph 6 of EM 405-1-904 upon expiration of the 30-day screening period.

5. Since the estimated value of the range property is in excess of \$25,000, Eng Form 2187-R is attached as Inclosure 6 in accordance with paragraph 7c(2) of EM 405-1-902 for obtaining the required clearance of the Department of Defense, after approval of excess by DCSLOG. As the estimated value of the property is less than \$50,000, clearance of the Armed Services Committees for the proposed disposal action is not required.

FOR THE DIVISION ENGINEER:

7 Incl

1 cy ea w/d


ROY W. SCHEUELE
Executive Assistant

Copy furnished:

CG, 6/A, Attn: AMLOG-ER

(PROTECTIVE MARKINGS ON THIS CORRESPONDENCE AND INCL. 6
CANCELLED UPON CLEARANCE FOR DISPOSAL BY DOD)

F-6

~~FOR OFFICIAL USE ONLY~~

ENGRE-MC (28 Jun 65)

2d Ind

SUBJECT: Recommendation of Excess, Port Angeles Combat Range, Washington

HQ, DA, OCoEngrs, Washington, D. C. 20315

7 September 1965

TO: Deputy Chief of Staff for Logistics, Department of the Army

1. The Port Angeles Combat Range is located about eight miles south-east of Port Angeles, Clallam County, Washington, on the Olympic Peninsula. It is comprised of 652.93 acres acquired at an original cost of \$34,611.

2. This property is a part of an original range leased from private owners and used for combat target training in connection with 75 and 37 MM weapons and small arms during 1943-44. Both high explosive and armor-piercing live ammunition were used in the training. In April 1944, the area was declared surplus to Army's needs and disposal action was taken of the Government-held leasehold interests in the privately owned lands. This disposal did not include decontamination nor inspection to determine the necessity for dedudiving. In 1948 two small boys were killed in the area by unexploded material which they found embedded in a tree. As a result of this fatal incident, inspection was made followed by dedudiving where practicable. As a result of later inspections, it was determined that the range may be contaminated with explosives and the recommendation was made that the range within probable limits of contamination be purchased in fee by the Government and any subsequent use thereof be limited to surface use only.

3. The suspected probable area of contamination was subsequently purchased and has been in possession of the Government with no active use being made except for protection to the public. The 547.93 acres of land which had formerly been held by lease were acquired in fee in 1961. The Government already owned 80 acres in fee, and 25 acres easement interest.

4. The property has recently been examined by a decontamination expert of the Corps of Engineers, who recommended that the property be reported to GSA for disposal subject to the restriction "for surface use only" and with a reservation of rights to the United States to post the perimeter of the contaminated range area with signs of warning to the general public and to inspect the restricted area annually for a period of three years. If, during this period, no explosives were found or reported to the District Engineer, such inspections may be discontinued.

5. The acquisition of this property in 1961 and the present proposal to excess the same land are not inconsistent. Prior to the acquisition of fee title, the Government could not restrict the use of the land to surface use only unless it continued to control the land through leasing action. Over the years rentals would exceed the fee value with the result that indefinite leasing action would be uneconomical to the Government. Since the Government now owns the fee title, by excessing the property to GSA it can limit the use of the property to surface use only. Thus the acquisition of fee title and subsequent disposal have served a useful purpose.

ENGRE-MC (28 Jun 65)

2d Ind

SUBJECT: Recommendation of Excess, Port Angeles Combat Range, Washington

5. It is recommended that the 652.93 acres described in the preceding correspondence be determined excess to Department of the Army needs subject to the condition that the land be disposed of for surface use only, and that the right to post the property be reserved. It is also recommended that this chain of correspondence be returned to the Chief of Engineers for further action.

FOR THE CHIEF OF ENGINEERS:



7 Incl
wd 2 cys ea

E. J. WITHERS
Colonel, Corps of Engineers
Director of Real Estate

Best
2-23

LOG/W1 11451

3rd Ind

SUBJECT: Recommendation of Excess, Port Angeles Combat Range, Washington

Headquarters, Department of the Army, Office of the Deputy Chief of Staff
for Logistics, Washington, D.C. 20310

SEP 22 1965

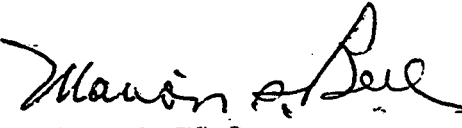
TO: Chief of Engineers, DA, Washington, D.C. 20315

1. The inclosed Report of Excess for the Port Angeles Combat Range
is approved.

2. Forwarded for continuation of action.

FOR THE DEPUTY CHIEF OF STAFF FOR LOGISTICS:

7 Incls
nc


MARION S. BELL
Lt Colonel, GS
Executive
Installations Management Division

ENGRE-MC (28 Jun 65)

4th Ind

SUBJECT: Recommendation of Excess, Port Angeles Combat Range, Washington

HQ, DA, OCoEngrs, Washington, D. C. 20315

27 September 1965

TO: Division Engineer, U. S. Army Engineer Division, North Pacific
Portland, Oregon

1. Referred for appropriate disposal action.
2. DOD Instruction 4165.12 has been revised as shown in the inclosed Memorandum to eliminate the necessity for prior approval of the Department of Defense with respect to disposals between \$25,000 and \$50,000.
3. This correspondence is regraded unclassified in accordance with paragraph 5 of AR 405-90.


FOR THE CHIEF OF ENGINEERS:

8 Incls

1.-7. nc

Added:

8. Cy DOD Memo
dtd 25 Aug 65


DENHAM A. MAUPIN
Assistant, Management
and Disposal Division
Real Estate

13 January 1989

MEMORANDUM FOR: RECORD

SUBJECT: Port Angeles Combat Range, DERP F10WA003300, Report of Current Ownership and Evidence of Former DOD Use on Their Property

1. On 23 September 1988 I visited Port Angeles, Washington, the county seat of Clallam County, to do a title search for above subject, Tracts A104, A106, and A107, comprising 32.00 acres. The following are my findings:

The deed from General Services Administration (GSA) to Raymond Diehl, et ux, dated 2 October 1967 and recorded in 1969 in Auditor's File No. 388816, Volume 324, Page 238-240, is not the same deed that GSA distributed to the Corps of Engineers. The DERP report dated 1985 was prepared using the information in the GSA-distributed deed. **THE RECORDED DEED DOES NOT CONTAIN THE HOLD HARMLESS CLAUSE.**

The 32.00 acres were subdivided as follows:

Parcel No. 1

FROM Marion G. Hansen (formerly Diehl) and Raymond L. Diehl Jr.

TO James L. McCrory

Conveyed by deed dated 10 February 1978, recorded 23 February 1978 in Auditor's File No. 478956.

FROM James L. McCrory

TO Edward G. Schreiner
1264 So. Deer Park Road
Port Angeles, WA 98362
(206) 452-4943
(Mrs. Schreiner's work number 524-0177)

Conveyed by Warranty Deed dated 5 August 1985, recorded in Auditor's File No. 569843, Volume 713, Page 622. This deed is subject to restrictions in the GSA deed. (Auditor's File No. 388816)

Parcel No. 2

FROM Marion G. Hansen (formerly Diehl) (5/6 interest) and Raymond L. Diehl, Jr. (1/6 interest)

TO Anthony Dichiacchio
201 Galer Street, Unit 266
Seattle, WA 98109
(206) 281-1620

Conveyed by Warranty Deed filed 19 September 1979, recorded in Auditor's File 595851, Volume 789, Pages 195-196. This deed is subject to restriction in the GSA deed (Auditor's File No. 388816).

Parcel No. 3

FROM Marion G. Hansen (formerly Diehl)

TO Raymond L. Diehl, Jr.
19178 - 11th Ave NE
Poulsbo, WA 98370
(206) 779-9229

A gift Quitclaim Deed conveying her 1/6 interest filed 3 October 1979 in Volume 562, page 139. No restrictions mentioned in deed.

Parcel No. 4

FROM Marion G. Diehl

TO Raymond L. Diehl, Jr.
19178 11th Avenue NE
Poulsbo, WA 98370
(206) 779-9229

A gift Quitclaim Deed conveying her 1/6 interest filed 21 March 1972 in Volume 376, Page 336. No restrictions mentioned in deed.

Parcel No. 5

FROM Marion G. Diehl

TO Raymond L. Diehl, Jr.
19178 11th Avenue NE
Poulsbo, WA 98370
(206) 779-9229

A gift Quitclaim Deed conveying her 1/6 interest filed 21 March 1972 in Volume 376, Page 336. No restrictions mentioned in deed.

Telephone conversation with Mr. Dichiacchio on 14 November 1988 revealed that no evidence of former DOD occupation on his property was observed. Mr. Dichiacchio did indicate however, that at the time of purchase there was evidence of recent logging. He also said that warning signs were posted across the road from his parcel.

Telephone Conversation with Mrs. Schreiner on 28 December 1988 revealed that there is no evidence of any former DOD occupation on their property. They have been going to the area for years even before purchasing the property and have seen nothing to indicate DOD use.

Telephone conversation with Mr. and Mrs. Raymond Diehl on 12 January 1989 revealed much the same as above conversations. Mr. Diehl was quite knowledgeable about the history of the area. He indicated that the 32 acres in question are across the road from the "action" and all the warning signs are posted across the road. He indicated the messhall, school etc. were on his side of road.

Lynn Walters, CENPS-RE-MD

PATTON MUSEUM OF CAVALRY AND ARMOR



October 11, 1994

SUBJECT: TO&E for 115th Cavalry, WY National Guard

Commander
U.S. Army Engineer District
ATTN: CENCR-ED-DN (Mr. George Williams)
PO Box 2004
Clock Tower Bldg
Rock Island, IL 61204-2004

Dear Mr. Williams:

Enclosed you will find the skeletal Table of Organization and Equipment (TO&E) for a Cavalry Recon Squadron (Mechanized). The 115th Cavalry, which you had inquired about, was reorganized into the 115th Cavalry Group - consisting of the 115th and 126th Cavalry Recon Squadrons (Mechanized) and HQ and HQ Troop, 115th Cavalry Group in January of 1944.

If you have questions concerning WWII and post WWII cavalry units, as well as any armored units and most infantry units, please do not hesitate to call or write us here at the museum. If you have questions concerning other unit types, I have included addresses and phone numbers below.

Field Artillery: U.S. Field Artillery and Fort Sill Museum
437 Quanah Road
Fort Sill, OK 73503-5100 (405) 351-5123
DSN 639-5123

Anti-Aircraft Artillery and Coastal Artillery:
U.S. Army Air Defense Artillery Museum
ATTN ATZC-DPT-MM
Fort Bliss, TX 79916-5300 (915) 568-5412
DSN 978-5412

POST OFFICE BOX 208
FARMINGTON, KY. 40121
PHONE (502) 624-3812

MEMBER:

U.S. Army Museums System; American Association of Museums; American Association for State & Local History; and International Association of Arms and Military History.



Accredited by
American Association
of Museums

Chemical Warfare Materials:

U.S. Army Chemical Corps Museum

ATTN: ATZN-CM-MM

Bldg 2299

Fort McClellan AL 36205-5000 (205) 848-6555

DSN 865-6555

I hope that this information will be of use.

Sincerely,

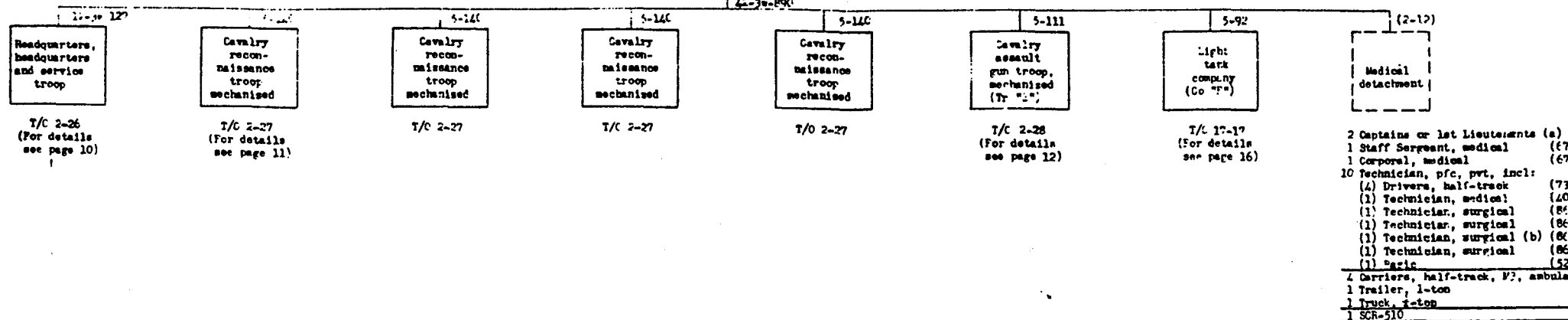


Charles R. Lemons

Curator, Patton Museum

Encl

CAVALRY
RECONNAISSANCE
SQUADRON
MECHANIZED



Summary of personnel:

	Hq, Hq and Serv Troop	4 Cav Recon Troops Mech (each)	Cav Assault Gun Troop Mech	Light Tank Co	Total So	Atchd Med	Aggregate
Lieutenant Colonel	1				1		1
Major	2				2		2
Captain	5	1	1	1	11		11
Captain or 1st Lieutenant						2	2
1st Lieutenant	3	2	2	2	15		15
2nd Lieutenant	1	2	2	2	13		13
Total commissioned	12	5	5	5	42	2	44
Warrant Officer	3				3		3
Master Sergeant	2				2		2
1st Sergeant	1	1	1	1	7		7
Technical Sergeant	6	1	1	1	12		12
Staff Sergeant	6	6	6	5	41	1	42
Sergeant	6	8	13	11	62		62
Corporal	3	10	10	2	55	1	56
Technician, grade 3						1	1
Technician, grade 4	26	12	9	14	97		98
Technician, grade 5	43	40	19	16	238		243
Private first class	12	25	21	17	180	1	181
Private	22	37	31	25	226	2	228
Basic (included)	(11)	(13)	(10)	(8)	(81)	(1)	(82)
Total enlisted	127	140	111	92	890	12	902
Aggregate	142	145	116	97	935	14	949

Summary of vehicles, weapons and radios:

	Hq, Hq and Serv Troop	4 Cav Recon Troops Mech (each)	Cav Assault Gun Troop Mech	Light Tank Co	Total So	Atchd Med	Aggregate
0 Car, armored, light, M3, with armament	4	12			52		52
0 Cardine	108	91	78	24	574		574
0 Carriage, motor, 75mm howitzer, M3, w/arm			8		8		8
0 Carrier, half-track, M3, ambulance						4	4
0 Carrier, half-track, M3A1, w/o armament	5	4	10	1	32		32
0 Gun, machine, cal. .50, light	9	13	6	1	68		68
0 Gun, machine, HB, cal. .50, flex	7	3	7	3	29		29
0 Gun, submachine	31	28	22	73	238		238
0 Launcher, rocket, AT	8	4	11	2	37		37
0 Mortar, 60mm		9			36		36
0 Mortar, 81mm	1		1	1	3		3
0 Pistol, automatic	3				3		3
0 Rifle, M1		26	16		120		120
0 Tank, light, with armament				17	17		17
0 Trailer, ammunition, M10	2		12		14		14
0 Trailer, 1-ton	12	5	1	1	34		35
0 Truck, 1-ton	10	23	2	2	106		107
0 Truck, 2 1/2-ton, cargo	14	1	1	1	20		20
0 Truck, heavy wrecker	1				1		1
0 Vehicle, tank recovery, without armament	1		1	1	3		3
S Radio set, including:	29	35	10	21	190	1	191
SCR-506	(7)	(12)		(1)	(56)		(56)
SCR-508	(5)	(12)		(1)	(54)		(54)
SCR-510	(3)	(10)	(8)	(2)	(53)	1	(54)
SCR-528	(3)	(1)		(7)	(15)		(15)
SCR-538	(1)		(1)	(10)	(12)		(12)

Notes:

- a - To be furnished only as required and available within the continental limits of the United States. Will be furnished prior to departure for overseas duty.
- b - Drives truck, 1-ton.

Cavalry reconnaissance squadron, mechanized is shown as organized when assigned to an armored division.

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR THE FORMER
PORT ANGELES COMBAT RANGE
PORT ANGELES, WASHINGTON
PROJECT NUMBER F10WA003301

APPENDIX G

REAL ESTATE DOCUMENTS

APPENDIX G

REAL ESTATE DOCUMENTS

Table of Contents

- G-1 Real Estate Planning Report on acquisition of contaminated lands, 1961 (B-45)
- G-2 Real Estate Utilization Report, 1961 (B-46)
- G-3 Tract Register, 1963 (B-47)
- G-4 QC Deed of range property to City of Port Angeles, 1968 (B-48)
- G-5 QC Deed of 32 acres to Raymond Diehl, 1968 (B-49)
- G-6 Realty Control Summary of potential FUDS site (B-50)

U. S. ARMY ENGINEER DISTRICT, SEATTLE
CORPS OF ENGINEERS
1519 ALASKAN WAY SOUTH
SEATTLE 4, WASHINGTON

REAL ESTATE PLANNING REPORT

PORT ANGELES COMBAT RANGE
CLALLAM COUNTY, WASHINGTON

1. PRELIMINARY.

a. Authority. - This report is prepared pursuant to teletype from the Chief of Engineers ENCE-MH 8022, dated 27 March 1961, as modified by teletype from HPHF 468-3, dated 29 March 1961.

b. Purpose. - The purpose of this report is to estimate the present fee value of lands lying within the contaminated area of the former Port Angeles Combat Range, Washington. The land and timber values set forth herein will be estimated on the basis of the contaminated condition which has prevailed since 1944 when the facility was declared surplus to the Army's needs.

2. NAME AND LOCATION OF PROJECT.

a. Name. - Port Angeles Combat Range.

b. Location. - This former combat range is located approximately eight miles southeast of Port Angeles, in Clallam County, Washington. It lies in the foothills of the Olympic Mountains, in Sections 4, 5, 8, 17 and 18, Township 29 North, Range 5 West of the Willamette Meridian.

3. HISTORICAL BACKGROUND.

The real estate covered by this report is part of the Port Angeles Combat Range, used for combat target training in connection with 75 and 37 MM weapons and small arms during 1943 and 1944. Both high explosive and armour piercing live ammunition were used in the training exercises. The area was declared surplus to Army's needs in April 1944. The Government held leasehold interest in the privately-owned land involved. Disposal action was taken on the leased areas, which did not include decontamination nor inspection to determine the necessity for decontamination.

In 1946 two small boys were killed in the area by unexploded material which they found imbedded in a tree. As a result of this fatality, inspection was made followed by decontamination where practicable. Some unexploded high explosive shells were found and destroyed by a Bomb and Shell Disposal Team, and on 7 May 1949 an area of approximately 775 acres of the range were certified as unsafe for any use except surface use.

During the spring of 1949, newspaper publicity was given to the dedudding operation and the danger involved in handling explosive missiles that might remain on the land. No action was taken to notify the individual landowners or the public of the restriction to surface use however, until one of the landowners involved in May 1952 requested decontamination of an area of his land that apparently had been omitted from the dedudding operation in 1949. Logging had been started in this area by a commercial logger, and had to be suspended when bulldozer operators refused to clear in the suspected area.

A Range Clearance Team again inspected the area, and on 22 September 1952 the Commanding Officer of the team recommended that the "Restriction to Surface Use" placed on the area in May 1949 remain. Action was then taken by the Seattle District Engineer's Office to advise the various landowners of the restriction on use of the land, and on 26 February 1953 a copy of the restrictive certificate was placed on record in the office of the Auditor of Clallam County, Washington.

Subsequently claims for loss in value of their properties as a result of the restriction were submitted to the Seattle District Engineer's Office by various owners of land within the contaminated area. Further information regarding the individual claims is contained in paragraph 8 of this report. Appraisals were made and the claims processed. No action was taken towards payment of the claims, however, and on 4 June 1954 a Real Estate Planning Report was prepared covering the estimated cost of fee acquisition of the contaminated area. This planning report recommended that all privately-owned land in the contaminated area be acquired in fee simple.

The planning report was supplemented on 4 October 1954 to present the estimated fair market rental value of each of the affected properties. A Real Estate Directive was issued 6 December 1954 authorizing lease of the privately-owned lands, the leases to provide for option to purchase the properties at their current fair market value, with the rentals applying to the purchase price. With the exception of Tract A-100 (owner - City of Port Angeles), unsuccessful attempts were made to obtain leases.

Subsequently the Deputy Chief of Staff for Logistics requested Sixth Army to take additional action towards decontaminating the affected area, with the view of returning to unrestricted use as much of the land as possible. Action on the submitted claims was deferred pending the additional dedudding efforts.

In November 1955 an Engineer Range Clearance Team reinspected the entire closed range, and on 23 November 1955 the range was certified as being safe for any use to which the lands were suited, with the exception of a one-acre tract which was designated "Hot", and recommended for surface use only. However, during the November 1955 inspection of the range large warning signs were posted around the range. The Commanding Officer of the November 1955 Engineer Range Clearance Team instructed that these signs

remain for at least ten years. Posting of the signs raised a question as to whether the lands should be returned to unrestricted use as recommended in the 22 November 1955 certificate of clearance, and the area was again inspected in January 1957 by a team under the direction of the Fort Lewis Ordnance Disposal Officer. As a result of this inspection it was determined that the range may be contaminated with explosives, and it was recommended by the inspection team that the Fort Angeles Combat Range within the probable limits of contamination be purchased in fee by the Government, and any subsequent use thereof limited to surface use only.

Subsequent to the above this office was directed to lease the lands restricted to surface use only in the former Fort Angeles Combat Range by 2nd Indorsement dated 21 August 1957 from HFD, file number 601.33 (Fort Angeles Combat Range, Washington), Subject: "Leasing Lands Within Former Fort Angeles Combat Range Restricted to Surface Use Only."

Following is a resume of the present status of all the former privately-owned tracts involved in this facility:

Tract A-100E. - 25.0 acres - Thirty Year Lease and Easement purchased by the Government effective for 30 years from 31 October 1955. Purchase price was \$100. for the term.

Tract A-101. - 350.0 acres - Negotiated settlement of claim for timber damages in amount of \$7,381., is pending. Leasehold condemnation (Civil No. 4792) dependant upon settlement of timber damage claim.

Tract A-102. - 80.0 acres - Fee title vested in the United States effective 28 December 1956 through action of Civil No. 3963. Price paid \$6,000.

Tract A-103. - 40.0 acres - Lease No. DA-45-100-ENG-4738 entered into 23 December 1958 to extend "in no event" beyond 30 June 1963. Annual rental \$36.-- Appraised rental value \$36.

Tract A-104. - 14.10 acres - Leased through Civil No. 4943 - Term extendable at Government option through 30 June 1962. Annual Rental \$280. - Appraised rental \$35.

Tract A-105. - 125.0 acres - Leased through Civil No. 4943 - Term extendable at Government option through 30 June 1962. Annual rental \$300. - Appraised rental \$150.

Tract A-106. - 18.78 acres - Lease No. DA-45-100-ENG-4836 entered 30 March 1959 to extend "in no event" beyond 30 June 1963. Annual Rental \$25. - Appraised rental \$25.

Tract A-107. - 7.12 acres - Leased through Civil No. 4943 - Term extendable at Government option through 30 June 1962. Annual rental \$400. - Appraised rental \$235.

Tract A-108. - 0.93 acre - Lease No. DA-43-108-ENG-4216 - entered 30 July 1957 to extend "in no event" beyond 30 June 1962. Annual Rental \$10. Appraised Rental \$10.

4. GENERAL DESCRIPTION OF THE PROPERTY AND TOTAL ACREAGE.

a. General Description. - This former facility is located in a rural area in the eastern foothills of the Olympic Mountains. The land is hilly and semi-mountainous in terrain and, except for the more level, cleared areas, is covered with second growth fir and alder. The south half of the area is steep semi-mountainous land with poor access. The westerly half of the northern half is deeply cut with ravines. The northeast portion is comparatively level and enjoys the only good access in the facility.

b. Total Acreage. - Total area in the project, as shown on the attached Drawing No. SE-RR-314, is 652.93 acres of which 88.0 acres has been acquired in fee. This report will therefore encompass 572.93 acres of privately owned land.

5. TRACT MAP.

Attached as Exhibit "A" is Drawing No. SE-RR-314, which is the Audited Map of the Fort Angeles Combat Range.

6. TRACT REGISTER.

<u>Tract No.</u>	<u>Owner</u>	<u>Acres</u>
A-100E	City of Fort Angeles	25.00
A-101	Milwaukee Land Company	350.00
A-103	Peninsula Plywood Corporation	49.00
A-104	Charles Jirikowic, et al	14.10
A-105	Ray H. Peterson, et ux	125.00
A-106	Groom-Zellerbach Corporation	10.78
A-107	Harry C. Miles, et al	7.12
A-108	Edith Yerkes	0.93
	TOTAL ACRES	572.93

7. CHARACTER AND SOIL, ACCESSIBILITY, ADAPTABILITY, DRAINAGE AND IRRIGATION, PRESENT USE, HIGHEST AND BEST USE, CLIMATE AND UTILITIES.

a. Character and Soil.

(1) Character. - Subject land is in a rural area topography of which varies from gentle, undulating fields to areas of steep mountain sides and deep ravines.

(2) Soil. The soils in the project area classified on the basis of economic land use are predominantly Class IV and Class V type soils. The Class V type soil is near the north project boundary and east of Horse Creek. The soil is mostly Kibola Loam (foothill phase), with Sullington Loam and a small quantity of Everett gravelly, sandy loam.

The Clallam County soil survey classifies this area as primarily suitable for forest purposes with a small area capable of producing peas, grain, hay and pasture.

b. Accessibility. - The project is accessible by an all weather County road (Deer Park Road) leading in from US Highway No. 101.

c. Adaptability. - The area as restricted is adaptable for grazing purposes. Without a restriction to surface use only, it would be adaptable for grazing, timber growing, production of hay and grain crops, and with that portion along Deer Park Road suitable for suburban residence.

d. Drainage and Irrigation.

(1) Drainage. - The drainage in this area varies from good to excessive, depending upon the topography.

(2) Irrigation. - There are no irrigated tracts within the project boundary.

e. Present Use, Highest and Best Use.

(1) Present Use. - No use is being made of the area with the following exceptions: Tract 100E, owned by the City of Port Angeles is used as part of their water shed. This use is passive and will remain so into the foreseeable future as the City wants no activity in their water shed. Tract A-105, owned by Ray H. Peterson, is being used for pasture and the production of hay. Hay production is reduced to the minimum as the land cannot be tilled and reseeded to good hay crops and is reverting to native grasses, and brush and alder.

(2) Highest and Best Use. - The land in its present contaminated condition has very limited capabilities. If all of the present timber crop was destroyed, highest and best use would be to let the land revert to timber reproduction. With the possibility of the presence of contaminated timber, highest and best use is for limited pasture. There is some argument in favor of using the timber for pulpwood, however, in my opinion the possibility of some of the timber being contaminated with unexploded high explosive shells (duds) precludes this use, particularly in view of the Fort Lewis Ordnance Disposal Officer's recommendation discussed in paragraph 3, above.

f. Climate. - The climate in this area varies due to the Straits of Juan de Fuca and the Olympic Mountains. The weather report of the US Department of Commerce in Port Angeles, Washington, indicates the following temperatures:

<u>TEMPERATURES</u>		<u>ANNUAL PRECIPITATION</u>	
Maximum	90.0°	Maximum	40.00"
Mean	47.4°	Mean	25.15"
Minimum	10.0°	Minimum	13.45"

The average depth of annual snowfall is about six inches. The average frost-free period for growing season is approximately 190 days.

8. Utilities. - Electric power and telephone service are available along Deer Park Road.

8. CLAIMS FOR DAMAGES.

Following is a resume of the claims which have been processed in connection with damages to lands within the Fort Angeles Combat Range:

a. Claim No. S-1251. - This claim, submitted by Ray H. and Agnes Peterson covered damages to Tract No. A-105. Claimed damages were \$8,575. Claim has been settled for \$5,800.

b. Claim No. S-1253. - This claim, submitted by Charles and Winifred Jirikowic covered damages to 20 acres of land of which Tract 14.10 acres is encompassed by Tract A-104. Claim was in the amount of \$15,365. Claim was settled for \$8,675, which included value of the modest residence constructed on Tract A-104 by the Jirikowic's.

c. Claim No. S-1254. - This claim, submitted by John E and Edith Yerkes covered approximately 117 acres of land of which present Tracts A-106, A-107 and A-108, totaling 18.83 acres were in the contaminated area. Claim was in the amount of \$10,000. Claim was settled for \$7,100, which included several old dilapidated buildings of which one residence was tenable albeit in a poor condition.

d. Claim No. S-1257. - This claim, submitted by Fred Mackenheimer, covered 80.0 acres identified as Tract A-102. This case was settled in Court action, Civil No. 3963 in which fee title was vested in the U. S. for a stipulated amount of \$6,000. This parcel of ground is not included in this planning report.

e. Civil No. 4792. - In this action the Milwaukee Land Company, owner of Tract A-101 comprising 350.0 acres, claims a present fair market value uncontaminated of approximately \$18,000. Negotiations with the Company has reached the point where it has been agreed to settle damages to timber for \$7,381. This appraiser has every reason to believe that the fee ownership of Tract A-101 could be acquired for \$11,000, plus the damages claimed by the Company in the amount of \$7,381.

9. SHOOTING DATA.

Investigations into the present market for timber lands in the Olympic Peninsula area indicate a wide spread of prices being paid, ranging from \$3. per acre to \$50. per acre for cut over timber land. The State of Washington pays from \$3. to \$5. per acre for freshly cut-over timber land. This appears to be a low price, however a considerable amount of remote inaccessible land has been purchased by the State for these prices. Green-Kellerbach, Peninsula Flywood and Ranger purchase cut-over land for prices ranging from \$25. to \$50. per acre, dependent upon the stand, quality and accessibility of reproduction. Top prices paid by these companies for accessible timber averages in \$50. per acre, and this price is paid only when unusual circumstances apply, such as consolidation or blocking

out of their holdings is required to give them better control.

In approaching my estimate of value in this report I am taking the stand that the land has been reduced, through contamination with high explosive shells, to minimal usage. Consideration has been given to damage claims paid and pending. In the case of Tract A-103, this 40.0 acre parcel is valued on a minimal usage basis even though no claim has been submitted.

Timber on the land, in its contaminated condition (possible presence of "duds") is considered to have no value.

Contingencies are not approached upon a percentage basis, but are rather based on what I consider a reasonable anticipated cost which could be expected in court action (trial by jury) based upon past experience in this particular project including, but not limited to, the annual rental stipulations granted by the Court notwithstanding damage claims previously paid covering these self-same parcels of land. No contingency item is included for Tract A-101 as the value included in this report for this land is known to be acceptable to the owner, Milwaukee Land Company, provided their claim for damages in the amount of \$7,381. is paid separately. No provision is made in this report for said \$7,381. damage claim.

In the case of Tract A-100E, owned by the City of Port Angeles, the Government owns a 30-year easement extending through October 1985. It is my opinion that this easement affords sufficient protection of the Government's interest and for that reason I am omitting the land area and fee value from the recommended acquisition below.

10. GROSS APPRAISAL.

Land Valuation (as contaminated):

Fee Title

65.81 acres, Contaminated timber land @ \$25./acre	Called	\$ 1,650.
350.00 acres, Contaminated timber land @ \$31.50/acre (Uncontaminated value \$18,400. less Negotiated Settlement of \$7,381.)	Called	11,000.
132.12 acres, Contaminated, cleared and semi-cleared pasture at average \$73./acre	Called	9,900.
<u>547.93 acres</u>	<u>TOTAL FEE</u>	<u>\$22,550.</u>

Easements:

25.00 acres, Existing easement extending to October 1985 - No Cost	- - -
---	-------

Surface Damage:

5.90 acres, Loss access, therefore reduced in value	200.
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Timber:

Timber contaminated with shell fragments and possibly "duds" has no merchantable value.	- - -
--	-------

Improvements:

All improvements are considered already paid for through settlement of claims - NONE	- - -
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Subsurface Rights:

None of value	- - -
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Relocations:

None required	- - -
---------------	-------

Resettlement Costs:

Two eligible applicants have already been
resettled

ESTIMATED TOTAL CONTAMINATED LAND VALUE	<u>\$22,750.</u>
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Contingencies:

Approach explained in paragraph 9. above	<u>7,600.</u>
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ESTIMATED TOTAL - LAND AND CONTINGENCIES	<u>\$30,350.</u>
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Administrative Costs (7 tracts):

Mapping & Surveys	NONE	
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Appraisals	\$1,200.	
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Title Evidence	700.	
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Negotiating, Closing, condemnation, etc		3,300.
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Resettlement Administration	<u>1,400.</u>	
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	NONE	
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TOTAL GROSS APPRAISAL	<u>\$31,650.</u>
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11. ASSESSED VALUES.

Total assessed value is approximately \$4,000. for the 347.93 acres being recommended for acquisition. No uniform ratio is reflected between assessed values and fair market values in Clallam County. Assessed values on this contaminated area should be lowered by reason of the contamination.

12. REIMBURSEMENT TO OWNERS AND TENANTS UNDER P.L. 155 and P.L. 534.

Two applicants were eligible for resettlement but have already been reimbursed. No provision for this item is required in this report.

13. RELOCATIONS.

No relocations will be necessitated by reason of the proposed acquisition.

14. EFFECT OF ACQUISITION ON LOCAL ECONOMY.

The proposed acquisition will have no significant effect upon the local economy.

15. LOCAL ECONOMIC CONDITIONS AND NEIGHBORHOOD FACTORS AFFECTING THE TREND OF REAL ESTATE VALUES.

The project area is located near the City of Port Angeles and affected by the economy governing this population center. Port Angeles has a population of approximately 13,000 and the population of Clallam County is approximately 27,000. The main industry in Port Angeles and Clallam County is timber and timber products, the largest operations being Crown-Zellerbach Corporation (Approximately 600 employees), Peninsula Plywood Corporation, (Approximately 400 employees), Rayonier Inc., (Approximately 575 employees), and Fibreboard Products Inc., (Approximately 230 employees). Besides these larger industries, there are smaller mills consisting of shingle mills, small saw mills and allied timber industries. There is one railroad, two steamship lines, one airline, passenger bus and six auto freights serving the community.

The economy of this County is governed chiefly by the timber industry and fluctuates with the condition of the timber market. There is considerable fishing in the area, commercially and for sport. Port Angeles has a harbor for 400 small boats. There is also considerable tourist trade as evidenced by approximately 80 tourist courts in the vicinity. The economy of the area and real estate values have remained fairly stable and constant during the past two or three years.

16. RECOMMENDATIONS.

The following recommendations are made with respect to acquisition of the former Port Angeles Combat Range.

a. That occupancy by the Government insofar as Tract A-100E is concerned, be continued under the terms of the existing 30 year Easement and Lease secured from the City of Fort Angeles on 31 October 1955.

b. That a Real Estate Directive be issued directing the acquisition of fee simple estate in Tracts A-101, A-103, A-104, A-105, A-106, A-107 and A-108, comprising 547.93 acres of land at an estimated fair market value, as contaminated, of \$22,750, plus contingencies estimated at \$7,600, for a total estimated cost of \$30,350, exclusive of administrative acquisition costs. It is iterated that the pending damage settlement on Tract A-101 with Milwaukee Land Company in the amount of \$7,391, is not included in the above estimate of contaminated value.

Attachment:

Exhibit "A" - Dwg SE-EE 31A.

CERTIFICATION

I certify that I have inspected the property covered in this Planning Report and have made investigations into the present fair market value of uncontaminated timber lands. Detailed report is submitted (except for formal write-up of market data) to reflect the overall picture of the situation and more fully support my reasoning with respect to contaminated value and my handling of contingencies.

Report Prepared By:

18 April 1961

T. L. McPhail

T. L. McPHAIL
Appraiser, NFS

REVIEWED AND APPROVED:

Malvin Christman

MALVIN CHRISTMAN
Chief, Real Estate Division, NFS

18 April 1961



DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, D. C.

AUG 15 1961

SUBJECT: Proposed Fee Acquisition of Contaminated Land, Port Angeles
Combat Range, Washington

TO: Chief of Engineers
Department of the Army
Washington 25, D. C.

1. Based upon the recommendation of the Deputy Chief of Staff for Logistics, I have determined that the lands described below are needed in the interest of national defense:

a. **BRIEF DESCRIPTION:** Those tracts or parcels of land, situated in Clallam County, Washington, and being portions of the former Port Angeles Combat Range, currently under lease to the Government because of contamination, and identified in the Real Estate Planning Report, dated 18 April 1961, as Tracts A-101, A-103, A-104, A-105, A-106, A-107, and A-108.

b. **ESTIMATED ACREAGE:** 547.93 acres, more or less.

c. **PROPOSED USE:** Restriction against public use because of contamination by high explosives.

d. **ESTIMATED COST:**

Land	\$22,750
Contingencies	2,250
Total Cost	\$25,000

e. **METHOD OF ACQUISITION:** Negotiation or condemnation.

f. **ESTATE TO BE ACQUIRED:** Fee simple title.

g. **AUTHORIZATION:** Section 2672 of Title 10, United States Code, as amended by Section 510 of the Act of Congress, approved 20 August 1958 (Public Law 85-685).

SUBJECT: Proposed Fee Acquisition of Contaminated Land, Port Angeles
Combat Range, Washington

h. APPROPRIATION: Public Law 86-601, approved 7 July 1960.

2. This directive is issued subject to giving notice to the
Chief of Legislative Liaison in order that he may notify the interested
Members of Congress.

Eugene H. Merrill

Eugene H. Merrill
Deputy Assistant Secretary of the Army (I&L)
(Installations)

REAL ESTATE DIRECTIVE
NO. 7493

REAL ESTATE UTILIZATION INSPECTION REPORT		DATE OF INSPECTION 13 July 1961																																								
DIVISION AND DISTRICT North Pacific - Seattle District																																										
1. NAME AND LOCATION OF INSTALLATION Port Angeles Combat Range, Mr. Port Angeles, Washington																																										
2. USING SERVICE OR ACTIVITY (a) U.S. Army Engineer District, Seattle; (b) U.S. Army Engr. Div., North Pacific; (c) Joint Army																																										
3. LEASE NO. See below	ANNUAL COSTS: (1) RENT \$1,206.00																																									
<input type="checkbox"/> GOVERNMENT OWNED	(2) MAINTENANCE, SERVICES & UTILITIES ---																																									
4. BUILDING SPACE USE																																										
A. TYPE OF SPACE <input type="checkbox"/> OFFICE <input type="checkbox"/> STORAGE <input checked="" type="checkbox"/> OTHER (Specify) Land only		B. TOTAL AREA OF SPACE (Show breakdown on reverse side) N/A SQ. FT.																																								
C. SPACE EFFICIENTLY UTILIZED <input type="checkbox"/> YES <input type="checkbox"/> NO (If NO explain below) N/A		D. ACTIVITY CAN BE CONSOLIDATED WITH ANOTHER AT DIFFERENT LOCATION <input type="checkbox"/> YES <input type="checkbox"/> NO (If YES give recommendations with supporting data below) N/A																																								
E. INACTIVE STORAGE SPACE SUITABLE FOR OTHER USE <input type="checkbox"/> YES <input type="checkbox"/> NO (If YES give recommendation below) N/A		F. MORE ECONOMICAL LEASED OR GOVERNMENT-OWNED SPACE AVAILABLE <input type="checkbox"/> YES <input type="checkbox"/> NO (If YES give recommendation with supporting data below) N/A																																								
5. LAND USE																																										
A. IS THERE AN APPROVED LAND UTILIZATION AND MGMT PLAN FOR THE INSTALLATION? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	B. HAVE LAND AREAS NOT REQUIRED EXCLUSIVELY FOR MILITARY USE BEEN MADE AVAILABLE FOR NON-MILITARY PURPOSES? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	C. TOTAL ACREAGE 652.93 acres																																								
6. REMARKS AND RECOMMENDATIONS																																										
<p>a. This report covers real estate that was used for combat training during 1943 and 1944. Original real estate rights were terminated in 1944; however, the discovery of live ammunition and the subsequent inspection of the lands by decontaminating teams resulted in a portion of the area being declared unsafe and restricted to surface use only. This action resulted in the filing of several claims against the Government for alleged loss in value of property. The contamination area was authorized for reacquisition by lease on 6 December 1954 and acquisition in fee was recommended by Real Estate Planning Reports made in June 1954 and December 1959. Leasehold interests have been acquired and fee acquisition is under consideration by higher authority.</p> <p>b. Current real estate interests at the present time are as follows:</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="text-align: center;">Fee</th> <th style="text-align: center;">Lease</th> <th style="text-align: center;">ACREAGE</th> <th style="text-align: center;">Engagement</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td style="text-align: center;">25.00</td> </tr> <tr> <td></td> <td>350.00</td> <td></td> <td></td> </tr> <tr> <td>80.00</td> <td>10.00</td> <td></td> <td></td> </tr> <tr> <td></td> <td>14.10</td> <td></td> <td></td> </tr> <tr> <td></td> <td>125.00</td> <td></td> <td></td> </tr> <tr> <td></td> <td>10.70</td> <td></td> <td></td> </tr> <tr> <td></td> <td>7.12</td> <td></td> <td></td> </tr> <tr> <td></td> <td>0.93</td> <td></td> <td></td> </tr> <tr> <td>80.00</td> <td>587.93</td> <td>652.93</td> <td>25.00</td> </tr> </tbody> </table> <p style="margin-top: 10px;">For 30 years - from 10/31/55 D/T - Civil No. 1943 (Cost \$315.00 P/A) D/T " " " DA 15-108-118-4738 (Cost \$36.00 P/A) D/T Civil No. 1943 (Cost \$35.00 P/A) D/T " " " (Cost \$550.00 P/A) DA 15-108-118-4816 (Cost \$25.00 P/A) D/T - Civil No. 1943 (Cost \$235.00 P/A) DA 15-108-118-4216 (Cost \$10.00 P/A) - Total 652.93 Acres (Cost per annum - \$1,206.00)</p>			Fee	Lease	ACREAGE	Engagement				25.00		350.00			80.00	10.00				14.10				125.00				10.70				7.12				0.93			80.00	587.93	652.93	25.00
Fee	Lease	ACREAGE	Engagement																																							
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	0.93																																									
80.00	587.93	652.93	25.00																																							
INSPECTOR (Signature) <i>D. K. Scott</i>	APPROVED (District, Div., R. E. Officer) <i>Albert L. Becker</i> ALBERT L. BECKER Ch, Hgt & Prop	DATE 14 July 1961																																								

(REVERSE SIDE MUST BE COMPLETED WHEN APPLICABLE)

R E Utilization Report - 13 July 1961
Port Angeles Combat Range, Mr. Port Angeles, Washington

6. Remarks and Recommendations (Cont'd)

- c. This inspection was made pursuant to telephone call received by this office that unauthorized usage was being made of Government-leased property. The following information was learned by subsequent inspection:

The Milwaukee Land Company has granted permission to the Peninsula Plywood Corporation usage of an existing access road for logging purposes across land area identified as Tract A-101 located in Sec. 8, T. 29 N., R. 5 W., W.M. Real estate interests acquired by the Government of subject tract are by D/T Civil No. 4943.

Access road commences at intersection of Deer Park Road, vicinity of N. 1/16, East Line, Sec. 8, traverses in southwesterly direction and leaves subject tract near S. 1/4, Sec. 8. Road has been recently improved by logging contractor through grading, dozing, and the replacement of new culverts. A lockable cable gate has been installed near intersection with Deer Park Road.

Conversation with Mr. Thompson, Timber Manager, and Mr. Robert T. Ahl, Field Engineer, both employees of Peninsula Plywood Corporation, revealed the following facts:

Verbal consent for road usage was given per telephone call in June 1961 between Mr. Thompson and Mr. Sackerson, General Manager of Milwaukee Land Company, 6616 White-Henry-Stuart Building, Seattle 1, Washington. Subsequent correspondence pertaining to the above reveals that a formalized instrument covering usage for a one-year period is now in progress. Mr. Thompson stated that one of the conditions set forth in instrument will be that Peninsula Plywood Corporation will accept all responsibility and liability pertaining to road usage.

Logging operations commenced on or about 25 June 1961 but are currently shut down because of fire restrictions currently existing throughout the Port Angeles area.

- d. It is recommended that the legality of subject road usage without consent or permission of this office be reviewed and corrective action be taken if necessary.
- e. In regards to paragraphs d and c of preceding report, dated 13 July 1961, there are no "warning signs" existing along main access road (Deer Park Road) bordering East edge of installation.

TRACT REGISTER		DIVISION North Pacific		<input type="checkbox"/> FINAL <input checked="" type="checkbox"/> REVISED FINAL		DATE PREPARED 29 August 1963	
(Separate Register to be prepared for each Real Estate Directive or Authorization)		DISTRICT Seattle		<input checked="" type="checkbox"/> ARMY <input type="checkbox"/> AIR FORCE <input type="checkbox"/> CIVIL <input type="checkbox"/> AEC		<input checked="" type="checkbox"/> OTHER (Specify)	
PROJECT (Official Name) Port Angeles Combat Range, Washington (4185)				DIRECTIVE NUMBER Ltr OCE - (ENGLS) 4th Ind OCE (ENGLP) (Tucker Act), 28 USC, (2) RE-D 7493 RE-D 7493A		DATE OF DIRECTIVE 6 December 1954 20 October 1955 17 September 1956 15 August 1961 9 July 1963	
PURPOSE (As Set Forth in Directive) Restriction against public use because of contamination by high explosives.							
TRACT NUMBER	LANDOWNER'S NAME	ACREAGE	PRICE	ESTATE 1/	METHOD 2/	LAST ACTION STEP TAKEN	REMARKS (Including Contract No. of Lease)
A-100E	City of Port Angeles	25.00	100.00	E	P	Final Certificate of Title 1-16-56.	Restrictive easement and lease for 30 yrs. from 10-31-55. Subject to (1) water right in and to waters of Morse Creek not exceeding 5.00 cubic feet per second under a Certificate of Water Right issued 11-2-45, Auditor's File No. 219326 Clallam County. (2) easement in Clallam County for Deer Park Road.
A-101	Milwaukee Land Company	350.00	8,300.00	F	P	Final Opinion 8-21-62	W/Deed 4-23-62. Formerly Leasehold Civil No. 4943.
A-102	Fred W. Machenheimer, et ux	80.00	6,036.08	F	*		Title was vested in U.S. by Judgment and Decree entered in U.S. District Court, Western District of Wash., Northern Division on 9-17-56, Civil Case 3963. Award for \$6,000 plus \$36.08 plaintiff's cost was made by the court. Payment was made by Dept. of Justice from a fund available to that office. (Involuntary Acq).
A-103	Peninsula Plywood Corporation	40.00	3,500.00	F	D/T	Final Opinion 9-27-63	D/T filed 6-29-62, Civil No. 5612. Price includes \$2,100.00 deficiency. Formerly Lease No. DA 45-108-Eng-4738.
A-104	Charles Jirikowic, et ux	14.10	1,000.00	F	D/T	Final Opinion 11-29-62	D/T filed 6-29-62, Civil No. 5612. Price includes \$300 deficiency. Formerly Leasehold Civil No. 4943.
A-105	Ray H. Peterson, et ux	125.00	12,950.00	F	D/T	Final Opinion 9-27-63	D/T filed 6-29-62, Civil No. 5612. Price includes \$7,950.00 deficiency. Formerly Leasehold Civil No. 4943. The portion in S8, T 29 N, R 5W, W, M, is subject to an easement in Clallam County for the Deer Park Road.
A-106	Crown Zellerbach Corporation	10.78	625.00	F	D/T	Final Opinion 7-12-63	D/T filed 6-29-62, Civil No. 5612. Owner shall have right to use and operate a road upon said 40' strip of land as described in Schedule 1 of Stipulation (0.66 acre). Deed 10-24-55 executed by Edith Yerkes to Harold J. Winters, et al, recorded 11-15-55 in Vol. 238 of Deeds, page 191, Auditor's File 291205, seller retains the right to use the water system now installed on the NW 1/4 of the NW 1/4 of S 9, T 29 N, R 5, same being piped to house on west half of the SW 1/4 of S 4, T 29 N, R 5 W, W.M. so long as seller maintains and operates said water system.
TOTAL							

ENG FORM 1019
1 APR 62

PREVIOUS EDITIONS MAY BE USED

(EN 405 - 1 - 1050)

A 4 8 2 6 8

TRACT REGISTER		DIVISION NORTH PACIFIC		<input type="checkbox"/> FINAL <input checked="" type="checkbox"/> REVISED FINAL		DATE PREPARED	
(Separate Register to be prepared for each Real Estate Directive or Authorization)		DISTRICT Seattle		<input checked="" type="checkbox"/> ARMY <input type="checkbox"/> AIR FORCE <input type="checkbox"/> CIVIL <input type="checkbox"/> AEC <input type="checkbox"/> OTHER (Specify)			
PROJECT (Official Name) Port Angeles Combat Range, Washington (4185)				DIRECTIVE NUMBER Ltr OCE - (ENGLS) 4th Ind OCE (ENGLP) *(Tucker Act) 28 USC 1346 (a) (2) RE-D 7493 RE-D 7493A		DATE OF DIRECTIVE 6 December 1954 20 October 1955 17 September 1956 15 August 1961 9 July 1963	
PURPOSE (As Set Forth in Directive) Restriction against public use because of contamination by high explosives.							
TRACT NUMBER	LANDOWNER'S NAME	ACREAGE	PRICE	ESTATE 1/	METHOD 3/	LAST ACTION STEP TAKEN	REMARKS (Including Contract No. of Lease)
A-107	Harry C. Miles, et ux	7.12	2,000.00	F	P	Final Opinion 8-8-62	W/Deed 6-21-62. Formerly Lease No. DA 45-108-Eng-4216. Agreement contained in deed 6-27-56 executed by Edith Yerkes to Harry C. Miles, recorded 7-6-56 in Vol. 241 of deeds, page 298, Auditor's File 295846.
A-108	William Robert Foreman, Executor of Est. of Edith Yerkes	0.93	100.00	F	P	Final Opinion 8-22-62	W/Deed 4-16-62. Formerly Lease No. DA 45-108-Eng-4216.
RECAP: Fee (8) 627.93 Eamt (1) 25.00 652.93							
9	TOTAL	652.93	34,611.08				

1/ "F" Fee; "LE" Leasehold; "L" License; "PE" Permit; "E" Easement; 2/ "P" Purchase; "D/T" Declaration of Taking; "WPA" War Powers Act Condemn.; "U" Unnegotiated; "T" Transfer; "D" Donation; "SC" Straight Condemn.; "L" Lease; "MWPA" Motored War Powers Action; "AG" Informal Agreement; "R" Reassignment

ENG FORM 1019
1 APR 62

PREVIOUS EDITIONS MAY BE USED

(EM 405 - 1 - 1050)

A 48268

RESETTLEMENT TRACT REGISTER

DIRECTIVE NUMBER
Ltr OCE (ENGLS)
4th Ind OCE (ENGLP)
☒ ARMY
☐ AIR FORCE
☐ CIVIL

DIRECTIVE DATE
6 Dec 20 0
DATE OF REPORT
30 June 1

TO: Chief of Engineers
Department of the Army
Washington, D. C.

FROM (Division)
North Pacific

DISTRICT
Seattle

LOCATION NAME

Port Angeles Combat Range

CITY

COUNTY

Clallam

STATE

Was

TRACT DATA

TRACT NUMBER (1)	OWNER AND/OR TENANT (2)	ESTATE (3)	TYPE OF PROPERTY (4)	FAIR VALUE OF PROPERTY (5)	DATE APPLICATION RECEIVED (6)	AMOUNT DEMANDED (7)	AMOUNT RECOMMENDED (8)
A104	Jirikowie, Charles and Winifred	LE	Residential	\$ 9,575.00	1-19-60	\$133.00	\$133.00
A107	Miles, Harry C. and Alesa H.	LE	Residential	2,450.00	4-26-60	157.00	157.00
				\$12,025.00		\$290.00	\$290.00

QUITCLAIM DEED

N. Wash - 140
Port Angeles Combat Range
Tracts A-101, A-102, A-103,
A-105, A-108 and A-100E

The UNITED STATES OF AMERICA, acting by and through the
Administrator of General Services under and pursuant to the powers and authority
contained in applicable provisions of the Federal Property and Administrative
Services Act of 1949, 63 Stat. 377, as amended, and regulations and orders
promulgated thereunder, (hereinafter referred to as "Grantor"), for and in con-
sideration of the sum of Ten Dollars and other good and valuable consideration,
does hereby convey and quitclaim to CITY OF PORT ANGELES, a municipal
corporation of the State of Washington, (hereinafter referred to as "Grantee"),
its successors and assigns, all of Grantor's right, title and interest in and to the
following described property (hereinafter referred to as "Property") situated in
Clallam County, State of Washington:

Those portions of the South Half of the Northeast
Quarter ($S\frac{1}{2}$ -NE $\frac{1}{4}$), the Southeast Quarter (SE $\frac{1}{4}$), and
the West Half (W $\frac{1}{2}$) of Section Eight (8), Township
Twenty-nine (29) North, Range Five (5) West, of the
Willamette Meridian, Clallam County, Washington,
lying East of a line which begins at the Southwest corner
of said Section Eight (8) and bears North eighteen degrees
twenty-six minutes ($18^{\circ} 26'$) East to the North line of said
Section Eight (8), and lying West of a line which begins in
the South line of said Section Eight (8) at a point thirty-five
hundred eighty-four (3584) feet East of the Southwest corner
thereof and bears North eighteen degrees twenty-six minutes
($18^{\circ} 26'$) East to the North line of said South Half ($S\frac{1}{2}$) of the
Northeast Quarter (NE $\frac{1}{4}$),

AND,

Southwest Quarter (SW $\frac{1}{4}$) of the Southeast Quarter (SE $\frac{1}{4}$) of
Section Five (5) and the Northwest Quarter (NW $\frac{1}{4}$) of the
Northeast Quarter (NE $\frac{1}{4}$) of Section Eight (8), all in Town-
ship Twenty-nine (29) North, Range Five (5) West of the
Willamette Meridian, County of Clallam, State of Washington,

AND,

The Northwest Quarter of the Southeast Quarter of Section 5,
Township 29 North, Range 5 West of the Willamette Meridian,
Clallam County, Washington,

AND,

The Southeast Quarter of the Southeast Quarter and the North-
east Quarter of the Southeast Quarter of Section 5; the Northeast
Quarter of the Northeast Quarter of Section 8; and all that
portion of the Southwest Quarter of the Southwest Quarter and

of the South Half of the Northwest Quarter of the Southwest Quarter of Section 4 lying Westerly of the present Deer Park Road, all in Township 29 North, Range 5 West of the willamette Meridian, Clallam County, Washington; EXCEPT that portion thereof, if any, conveyed to Clallam County for right of way purposes by deed dated October 22, 1943, recorded in Volume 158 of Deeds, Page 122, records of said county,

AND,

A parcel in that portion of the Northwest Quarter of the Northwest Quarter of Section 9, Township 29 North, Range 5 West of the Willamette Meridian, Clallam County, Washington, lying Northwesterly of the Deer Park Road, said parcel being described as beginning at the Northwest corner of said Section 9; thence East 160 feet in the North line thereof; thence South 18° 26' West 506 feet, more or less, to the West line of said Section 9; thence North 480 feet in the said West line to the point of beginning.

TOGETHER WITH a parcel of land acquired by a Thirty Year Easement and Lease from the City of Port Angeles identified as Tract No. A-100E and more particularly described as:

That portion of the East Half of the Southwest Quarter of Section 5, Township 29 North, Range 5 West of the Willamette Meridian, Clallam County, Washington, which lies Easterly of a line beginning at the center of said Section 5 and runs thence South 13° 23' West 2730 feet, more or less, to the South line thereof.

TOGETHER WITH improvements located thereon.

SUBJECT TO

Certificate of Clearance dated May 7, 1949, recorded February 28, 1953 in Volume 225 of Deeds, Page 235, under Auditor's file No. 273158, records of Clallam County, Washington.

Restriction limiting uses which would preclude any tilling or excavating of the ground or harvesting of timber.

Whereas, said Property was a part of the Port Angeles Combat Range, a military establishment used for gunnery practice, and portions of this Property were subjected to contamination by the introduction of shells, duds or unexploded material either below or upon the surface thereof; and

Whereas, the grantor has caused the Property to be inspected and has decontaminated the said Property to the extent deemed reasonably necessary, and, to the extent deemed consistent with sound economic limitations, has cleared the Property of all dangerous and explosive materials reasonably possible to detect, and has made certain recommendations pertaining to the use to which the land may be devoted; and

Whereas, the grantor, does not intend to make, nor shall it be construed to have made, any representations or warranties pertaining to the condition of the land; and

Whereas, the herein designated grantee has entered into a contract to purchase said Property with full knowledge of, and notwithstanding the foregoing recitals which are incorporated for the purpose of disclosing the former use made of the Property herein described; and

By acceptance of this instrument, the grantee admits and confesses to full knowledge with respect to the facts contained in the foregoing recitals as to possible contaminated condition of the Property.

By acceptance of this instrument, and as a further consideration for this conveyance, the grantee herein covenants and agrees for itself, its successors or assigns, to assume all risk for all personal injuries and Property damages arising out of ownership, maintenance, use and occupation of the foregoing Property; and further covenants and agrees to indemnify and save harmless the United States of America, its servants, agents, officers, and employees, against any and all liability, claims, causes of action, or suits, due to, arising out of or resulting from, immediately or remotely, the possible contaminated condition, ownership, use, occupation or presence of the grantee, or any other person, upon the Property, lawfully or otherwise

Existing easements for public roads, public highways, public utilities, railroads and pipelines and to the reservations, exceptions and any other outstanding rights contained in or referred to in patents issued by the United States.

All easements, liens, reservations, exceptions or interests of record or now existing on the above described premises.

RESERVING TO the United States of America, the right to inspect the Property herein described annually for a period of three (3) years following date of conveyance of the Property herein described for the purpose of detecting and removing contaminated material.

RESERVING TO the United States of America the right to post warning signs and legibly maintain them on the perimeter of the Property herein described.

TO HAVE AND TO HOLD the Property together with all the privileges and appurtenances thereto belonging, unto Grantee, its successors and assigns, forever.

The Property was duly acquired by the United States of America and was determined to be surplus to the needs and requirements of the United States of

America and assigned to General Services Administration for disposal pursuant to authority contained in the said Federal Property and Administrative Services Act as amended, and applicable orders and regulations promulgated thereunder.

IN WITNESS WHEREOF, Grantor has caused this instrument to be executed as of October 10, 1967.

UNITED STATES OF AMERICA
Acting by and through the
Administrator of General Services

(GSA SEAL)

By /s/ R. McLeod
Acting Chief, Real Property Division
Property Management and Disposal Service

STATE OF WASHINGTON)

COUNTY OF KING) ss
)

On this 9th day of January, 19 68, before the undersigned, a Notary Public in and for the State of Washington, personally

appeared R. McLeod, to me known to be the Acting Chief, Real Property Division, Property Management and Disposal Service, General Services Administration, Region 10, and to me known to be the individual described in and who executed the foregoing instrument and who under oath stated that he was duly authorized, empowered and delegated by the Administrator of General Services to execute the said instrument and acknowledged the foregoing instrument to be his free and voluntary act and deed, acting for and on behalf of the Administrator of General Services, acting for and on behalf of the United States of America, for the uses and purposes therein mentioned.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate above written.

/s/ Robert Douglas Green
Notary Public in and for the State of
Washington, residing at Federal Way

(Notarial Seal)

Distribution: 1/18/68
JAG, Lands Division
CofEngrs, ENGREG-MC
Ch, Prop&acctg Br, NPS
Ch, Operations Div,
Surplus Fac Ofcr, NPS
Historical Files (2)
RE Files

QUITCLAIM DEED

The UNITED STATES OF AMERICA, acting by and through the Administrator of General Services under and pursuant to the powers and authority contained in applicable provisions of the Federal Property and Administrative Services Act of 1949, 55 Stat. 377, as amended, and regulations and orders promulgated thereunder, (hereinafter referred to as "Grantor"), for and in consideration of the sum of Ten Dollars and other good and valuable consideration, does hereby convey and quitclaim to RAYMOND L. DIEHL and MARION G. DIEHL, husband and wife, (hereinafter referred to as "Grantees"), their heirs and assigns, all of Grantor's right, title and interest in and to the following described property (hereinafter referred to as "Property") situated in Clallam County, State of Washington:

Tract A-104
11.10 acs
\$1,000⁰⁰
That part of the north half of the northwest quarter of the southwest quarter of Section 4, Township 29 North, Range 5 West of the Willamette Meridian, Clallam County, Washington, lying west of a line beginning in the north line of said north half of the northwest quarter of the southwest quarter at a point 1040 feet east of the west line of said Section 4 and extending south 15° 23' west 350 feet, more or less, to the south line of said north half of the northwest quarter of the southwest quarter at a point 320 feet east of the west line thereof.

AND

Tract A-106
10.78 acs
\$625⁰⁰
A parcel in the south half of the northwest quarter of the southwest quarter of Section 4, Township 29 North, Range 5 West of the Willamette Meridian, Clallam County, Washington, said parcel being described as that portion lying easterly of the present Deer Park Road and westerly of a line beginning at a point in the north line of said south half of the northwest quarter of the southwest quarter which is 820 feet east of the west line of said Section 4, and runs thence south 15° 23' west 300 feet, more or less, to the south line thereof at a point which is 300 feet east of the said west line.

AND

Tract A-107
7.12 acs
\$1,000⁰⁰
A parcel in the west half of the southwest quarter of the southwest quarter of Section 4, Township 29 North, Range 5 West of the Willamette Meridian, Clallam County, Washington, said parcel being described as that portion lying easterly of the present Deer Park Road and westerly of a line beginning at a point in the north line of said west half of the southwest quarter of the southwest quarter which is 300 feet east of the west line of said Section 4, and runs thence south 15° 23' west 310 feet, more or less, to the said Deer Park road.

W-1146-745
Exhibit "B"

SUBJECT TO

Certificate of Clearance dated May 7, 1949, recorded February 23, 1953, in Volume 225 of Deeds, page 235 under Auditor's file No. 273186, records of Clallam County, Washington.

Existing easements for public roads, public highways, public utilities, railroads and pipelines and to the reservations, exceptions and any other outstanding rights contained in or referred to in patents issued by the United States.

All easements, liens, reservations, exceptions or interests of record or now existing on the above described premises.

RESERVING TO the United States of America, the right to inspect the Property herein described annually for a period of three (3) years following date of conveyance of the Property herein described for the purpose of detecting and removing contaminated material.

RESERVING TO the United States of America the right to post warning signs and legibly maintain them on the perimeter of the Property herein described.

TO HAVE AND TO HOLD the Property together with all the privileges and appurtenances thereto belonging, unto Grantees, their heirs and assigns, forever, subject to the following restrictions and covenants, which shall run with the land:

Whereas, the Property was a part of the Port Angeles Combat Range, a military establishment used for gunnery practice, and portions of Property were subjected to contamination by the introduction of shells, duds or unexploded material either below or upon the surface thereof; and

Whereas Grantor has caused the Property to be inspected and has decontaminated the said Property to the extent deemed reasonably necessary, and to the extent deemed consistent with sound economic limitations, has cleared the Property of all dangerous and explosive materials reasonably possible to detect, and has made certain recommendations pertaining to the use to which the land may be devoted; and

Whereas, Grantor does not intend to make, nor shall it be construed to have made, any representations or warranties pertaining to the condition of the land; and

Whereas, the Grantees have entered into a contract to purchase the Property with full knowledge of, and notwithstanding the foregoing recitals which are incorporated for the purpose of disclosing the former use made of the Property herein described; and

By acceptance of this instrument, Grantees admit and confess to full knowledge with respect to the facts contained in the foregoing recitals as to possible contaminated condition of the Property.

By acceptance of this instrument, and as a further consideration for this conveyance, the Grantees covenant and agree for themselves, their heirs, successors, or assigns, to assume all risk for all personal injuries and Property damages arising out of ownership, maintenance, use and occupation of the foregoing Property; and further covenant and agree to indemnify and save harmless the United States of America, its servants, agents, officers and employees, against any and all liability, claims, causes of action, or suits, due to, arising out of, or resulting from, immediately or remotely, the possible contaminated condition, ownership, use, occupation or presence of the Grantees, or any other person, upon the Property, lawfully or otherwise.

Grantees also covenant and agree that the Property shall not be used for any purpose involving tilling or excavating of the ground or the harvesting of timber.

The Property was acquired by the United States of America by Declaration of Taking, Civil No. 5512, filed June 29, 1962 in the United States District Court for the Western District of Washington, Northern Division, and by Warranty Deed dated June 21, 1962, recorded in Volume 265 of Deeds, Page 734, records of Clallam County, Washington.

The Property was both duly determined to be surplus to the needs and requirements of the United States of America and assigned to General Services Administration for disposal pursuant to authority contained in the said Federal Property and Administrative Services Act as amended, and applicable orders and regulations promulgated thereunder.

IN WITNESS WHEREOF, Grantor has caused this instrument to be executed as of October 2, 1967.

UNITED STATES OF AMERICA
Acting by and through the
Administrator of General Services

(GSA SEAL)

By _____
Chief, Real Property Division
Acting Property Management and Disposal Service

STATE OF WASHINGTON)

COUNTY OF KING)

On this 27th day of February, 1958, before the undersigned, a Notary Public in and for the State of Washington, personally appeared R. McLeod, to me known to be the Acting Chief, Real Property Division, Property Management and Disposal Service, General Services Administration, Region 10, and to me known to be the individual described in and who executed the foregoing instrument and who under oath stated that he was duly authorized, empowered and delegated by the Administrator of General Services to execute the said instrument and acknowledged the foregoing instrument to be his free and voluntary act and deed, acting for and on behalf of the Administrator of General Services, acting for and on behalf of the United States of America, for the uses and purposes therein mentioned.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate above written.

/s/ Robert Douglas Green
Notary Public in and for the State of
Washington, residing at Federal Way

(Notarial Seal)

Distribution: 3/11/68
JAG, Lands Division
CofE, ENGREG-NC
Ch, Prop Acctg Br, NPS
Ch, Operations Div.
Surplus Fac Ofcr, NPS
Historical Files (2)
RE Files

REALTY CONTROL FILE SUMMARY
(Lead Acquisitions and Disposals Subsequent to 1 July 1940)

RESERVATION NAME:

1991

Port Angeles Army Air Field, Washington

OFFICIALLY DESIGNATED BY:

LOCATION:

In Clallam County, 62 miles N. W. of Seattle

TYPE:

Satellite Air Field, Sub-Base, McChord Field

LAND OWNERSHIP AND COST DATA

ACQUISITION ACTIONS

DISPOSAL ACTIONS

Exhibits "A"

Exhibits "B"

NET AREA

GROSS COST

221.21 Acres, Fee
0.64 of an acre, easements (6)
0.28 of an acre, licenses (8)
61.62 acres, permits (9)
303.95 acres, total area acquired
303.95 acres*
000.00

\$54,345.00

JURISDICTION

RELOCATIONS

Exhibits "C"

FINAL PROJECT MAP

Exhibit "F"

MISCELLANEOUS PAPERS

Exhibits "E"

REMARKS:

*Transferred to Navy Dept., 7-4-1944

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR THE FORMER
PORT ANGELES COMBAT RANGE
PORT ANGELES, WASHINGTON
PROJECT NUMBER F10WA003301

APPENDIX H

NEWSPAPERS/JOURNALS
(Not Used)

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR THE FORMER
PORT ANGELES COMBAT RANGE
PORT ANGELES, WASHINGTON
PROJECT NUMBER F10WA003301

APPENDIX I

INTERVIEWS

APPENDIX I

INTERVIEWS

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CONVERSATION RECORD	TIME AM	DATE 26 Jul '94
TYPE		
<input checked="" type="checkbox"/> VISIT	<input type="checkbox"/> CONFERENCE	<input type="checkbox"/> TELEPHONE <input type="checkbox"/> INCOMING <input type="checkbox"/> OUTGOING
NAME OF PERSON CONTACT WITH Mel Sund, Forester	ORGANIZATION Clallam County	TELEPHONE NO. 360-417-2400
SUBJECT Port Angeles Combat Range		

SUMMARY

Ms. Mary Jo Civis and Ms. Karen Beachler met with Mr. Sund in his office at the County Court House in search of some old aerals of the site. He graciously did some digging and located a 1957 aerial of the site that he shared with us. He placed the photos under a stereoscope in order to see if there was anything visible that could help the investigation.

Mr. Sund was very skilled in aerial photo interpretation and explained everything that could be observed to the team. He noted the deep canyons and explained that this and other physical characteristics would have limited the way the area could have been utilized as a target range. In viewing the open range area closely, he noted no obvious signs of range usage. There were no visible craters, berms, or any unnatural features that could be observed.

ACTION REQUIRED

NONE

ACTION TAKEN

NAME OF PERSON DOCUMENTING COVERSATION Mary Jo Civis	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER 309-794-6010
SIGNATURE <i>Mary Jo Civis</i>	TITLE QASAS	DATE 26 Jul '94

I-1

CONVERSATION RECORD		TIME PM	DATE 26 Jul '94
<input checked="" type="checkbox"/> VISIT	<input type="checkbox"/> CONFERENCE	TELEPHONE INCOMING OUTGOING	
NAME OF PERSON CONTACT WITH Ron Johnson	ORGANIZATION Port Angeles City Engineer	TELEPHONE NO. 360-457-0411	
SUBJECT Port Angeles Combat Range			

SUMMARY

Ms. Mary Jo Civis and Ms. Karen Beachler met with Mr. Johnson who escorted the team to the portion of the former site that is now owned by the City. This area included what is the majority of the range impact area.

Mr. Johnson gave the team a small drawing which showed all the land in the area that the city owned. He explained that the basic purpose for maintaining the land is as a watershed. He stated that it is rarely traversed by the city itself, or probably anyone for the most part. They do however lease a few areas of the site for cattle grazing where appropriate.

Entry into the area was made by breaching a barbed wire fence that runs along Deer Park Rd. Mr. Johnson explained that is how he gets in since the fence is maintained by the person that grazes the cattle in the clearing (which is the area of the actual range/impact area). We also noted a sign warning of the potential hazard due to the former use as a target range near the point of entry.

Mr. Johnson had little knowledge of the actual range itself, but did state that he has never found any ordnance items on the city property, nor was he aware of another city employee finding anything.

He pointed out some grass near the southern portion of the cleared area and indicated that this was indicative of marshes/wetlands.

ACTION REQUIRED
NONE

ACTION TAKEN

NAME OF PERSON DOCUMENTING COVERSATION Mary Jo Civis	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER 309-794-6010
<i>Mary Jo Civis</i>	TITLE QASAS	DATE 26 Jul '94

CONVERSATION RECORD		TIME AM	DATE 27 July 1994
TYPE			
<input checked="" type="checkbox"/> VISIT		<input type="checkbox"/> CONFERENCE	<input type="checkbox"/> TELEPHONE <input type="checkbox"/> INCOMING <input type="checkbox"/> OUTGOING
NAME OF PERSON CONTACT WITH Raymond Diehl, Jr. and Marian Hanson P.O. Box 1505 Poulsbo, WA 98270		ORGANIZATION Landowners of former site property	TELEPHONE NO. 360-779-9229
SUBJECT Port Angeles Combat Range			

SUMMARY

Mary Jo Civis and Karen Beachler met with Mr. Diehl and Ms. Hanson on their property they purchased in 1958.

Mr. Diehl stated that his family originally purchased 34 acres in Sep '67, then divided and sold some to McClury who sold to Schreiner. They currently own about 10 acres. He said he sold a 9 acre plot to a logger who took the lumber to the mill and never had any problems from shrapnel.

Because they had purchased the land as an investment, the restriction placed on the land (surface use only) was a problem. His father did not believe there was any contamination there and went to GSA to have the restriction clause removed from his property. He was successful. Mr. Diehl gave us copies of the letter from GSA.

Mr. Diehl and Ms. Hanson showed us around the property. They pointed out an old foundation and noted that the building was gone when they purchased the land.

When asked about any specifics of range usage, Mr. Diehl pointed out that anything he knew was hearsay. He went on to tell he understood they only fired on the west side of Deer Park Rd. and in a south/southwest direction toward the mountains. He noted that an old school house once stood on the 32 ac. he purchased and he had heard that the troops may have used it.

He referred us to a Mr. Bladelock that he said owned a ranch in the area and might have some first hand knowledge.

ACTION REQUIRED

Follow up on Mr. Bladelock

ACTION TAKEN

"Mr. Bladelock" determined to be "Mr. Baron" who was contacted.

NAME OF PERSON DOCUMENTING COVERSATION Mary Jo Civis	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER 309-794-6010
SIGNATURE <i>Mary Jo Civis</i>	TITLE QASAS	DATE 7-27-94

CONVERSATION RECORD		TIME AM	DATE 27 Jul '94
<input checked="" type="checkbox"/> VISIT	<input type="checkbox"/> CONFERENCE	TELEPHONE <input type="checkbox"/> INCOMING <input type="checkbox"/> OUTGOING	
NAME OF PERSON CONTACT WITH Ed Schreiner 1264 S. Deer Park Rd. Port Angeles, WA	ORGANIZATION Landowner of former site property	TELEPHONE NO. 360-452-4943	
SUBJECT Port Angeles Combat Range			

SUMMARY

Ms. Mary Jo Civis and Ms. Karen Beachler met with Mr. Schreiner at his office. He works for the National Park Service as a biologist and owns land east of Deer Park Rd.

Mr. Schreiner told the team that the deeds to his property do not have any restrictions of land use. He also stated that Thomas Tinkham had done excavating on his property from 1' to 2' and never found any items he thought were ordnance, or pieces of ordnance.

Because he had not been around the area all his life (he bought the property from McClury who bought it from Diehl) he knew nothing of the range usage. He heard something about 2 men being killed by an old round somewhere west of Morse Creek in the 60's maybe, but did not know for sure.

He mentioned the old one room school house on his property that he tore down about 4 yrs ago and stated that Joe Baron leases 200 acres of range and may be a good source.

Because of his work with the Park Service, I asked him if he might have any old aerials. After some digging, Mr. Schreiner was able to locate a 1939 aerial of the site. The cleared area appeared somewhat similar to later aerials the team had viewed with the exception that the growth in the center of the site varied and a small area of lined up trees was visible. This was apparently the "orchard" referred to in another conversation.

Mr. Schreiner also gave the team a report he had helped prepare because it contained good information on the climate, geology, etc., of the area.

ACTION REQUIRED

Follow up on Joe Baron & Thomas Tinkham

ACTION TAKEN

Interview scheduled w/ Mrs. Baron. Tinkham contacted.

NAME OF PERSON DOCUMENTING COVERSATION Mary Jo Civis	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER 309-794-6010
	TITLE QASAS	DATE 7-27-94
<i>Mary Jo Civis</i>		

I-4

CONVERSATION RECORD		TIME PM	DATE 7-27-94
TYPE			
<input checked="" type="checkbox"/> VISIT		<input type="checkbox"/> CONFERENCE	<input type="checkbox"/> TELEPHONE
			INCOMING
			OUTGOING
NAME OF PERSON CONTACT WITH Mrs. Mickey Baron	ORGANIZATION Local landowner	TELEPHONE NO.	
SUBJECT Port Angeles Combat Range			

SUMMARY

Ms. Mary Jo Civis and Ms. Karen Beachler met Mrs. Baron at her home in Port Angeles. Her husband, Joe, leased land for grazing in the area of the former range. While she did not live in the area during site usage, she had friends that did and was somewhat familiar with activities there. She moved in around '59 or '60.

She stated that the firing was all on the west side of the road and toward the mountains (south/southwest). She said there were never any buildings associated with the range, just a latrine. There was an old barn that eventually blew over, a fruit orchard, and 2 dairy tanks already there, but that was all. When asked if there were any buildings on the east side of the road that may have been used she stated that Roscoe Mills had a property just north of the old school house, but there was nothing there that the troops put up and used.

Her friend had told her the troops came in each morning to the range and left at the end of the day. They drove past her home north of the site on Deer Park Rd. She mentioned other nearby military locations at the time were Camp Hayden and Fort Warden (Townsend).

She remembered Nick Rotello mentioning picking up shells in the area before the two boys were killed.

She stated that a friends father was part of a team of locals that walked the site arm-in-arm after closure to clear the area. This was before the two boys were killed.

When asked about any ordnance being found around the site, she said that one time her son had found 2 unexploded shells while in a wooded area. Because he left them there, she did not know exactly where he found them or what type they were. But, she did note that she never heard of any ammo being found outside the condemned area.

We told her we were a little confused with the creeks running through the site because other individuals had conflicting info on which creek was which. She stated that Morse creek was the one far behind the clearing, but was not sure about Frog and Surveyor Creeks.

When asked if any of her friends were still around that remembers the training, she gave us the name of Ms. Florence Bailey. She said that she had an unlisted phone and could not give it to us. When asked if she would call to see if Florence was willing to meet with us, she agreed. Florence agreed to see us that night.

Ms. Baron noted that her husband would be back in August and could have more information. She also gave us her sons name and phone number so we could follow up with him: Ron Baron, 452-7213.

ACTION REQUIRED

Contact son to see if he remembers where he found the shells.

ACTION TAKEN

NAME OF PERSON DOCUMENTING COVERSATION	ORGANIZATION	TELEPHONE NUMBER
Mary Jo Civis	CENCR-ED-DO	309-794-6010
SIGNATURE	TITLE QASAS	DATE 7-28-94

Mary Jo Civis

CONVERSATION RECORD		TIME PM	DATE 27 Jul 1994
TYPE			
<input checked="" type="checkbox"/> VISIT		<input type="checkbox"/> CONFERENCE	<input type="checkbox"/> TELEPHONE <input type="checkbox"/> INCOMING <input type="checkbox"/> OUTGOING
NAME OF PERSON CONTACT WITH Florence Bailey (& Don Barker)	ORGANIZATION Resident during site usage	TELEPHONE NO. Unlisted	
SUBJECT Port Angeles Combat Range			

SUMMARY

Ms. Bailey was interviewed in her home, along with Mr. Don Barker, by Ms. Mary Jo Civis and Ms. Karen Beachler. Ms. Bailey was a teenager living in the area during the time the range was active. Mr. Barker lived in the area also, but because he fought during WW II, he was not actually there during most of the time the range was used.

Ms. Bailey stated that the troops using the range came down from the fair grounds where they camped. Each day they would drive their vehicles into the range area, practice firing and leave. She remembered them also practicing crawling under barbed wire fences in the middle of the field. She said that a group would camp at the fair grounds for about 2wks. of training. Then they'd leave and a new group would come in. She guessed they would show up at the range around 9:30 AM and leave at various times, maybe as late as 6:30 PM.

When asked what she could remember about the range and actual firing, she said that they fired toward the mountains/tunnels in line with the orchard (SW), which Mr. Barker concurred with. She said they never had any targets that she saw, all she saw them fire at was old tracked vehicles near the old barn. She said they entered the site across the road from the old school house. She said they never fired across the road to her knowledge. And when asked if they even closed the road during firing, she didn't remember them doing that, but noted that there wasn't much beyond the point they entered the site and never really paid attention. She knew they didn't near her house.

When asked if any buildings were associated with the site, she noted a latrine sat on the far west edge of the

range (clearing), north of the orchard. When we told her others had indicated that a barracks and/or mess hall may have existed on the east side of the road, she clearly said no and pointed out that she remembered the chow wagon coming down the road to bring them lunch. She said they could have used the old school house to eat out of the rain, but there was no mess hall or barracks.

When asked about any accidents or ordnance finds after the site closed, she and Mr. Barker both recalled the 2 boys that were killed by a 37mm round while logging. When asked about 2 men being killed in the 60's (as stated in another interview) they said that wasn't accurate and was probably confused with the other accident.

As for range cleanup, she didn't recall one until after boys were killed. Both her and Mr. Barker stated that they haven't heard of any problems since then.

Upon request, Ms. Bailey did give the team her phone number, but was promised it would not be published in the report.

ACTION REQUIRED

Do not publish phone number.

ACTION TAKEN

Phone number kept in notes with archived ASR files.

NAME OF PERSON DOCUMENTING COVERSATION	ORGANIZATION	TELEPHONE NUMBER
Mary Jo Civis	CENCR-ED-DO	309-794-6010
SIGNATURE	TITLE QASAS	DATE 7-27-94

Mary Jo Civis

CONVERSATION RECORD		TIME AM	DATE 28 Jul 94
TYPE			
<input type="checkbox"/> VISIT		<input type="checkbox"/> CONFERENCE	<input checked="" type="checkbox"/> TELEPHONE
			<input type="checkbox"/> INCOMING
			<input checked="" type="checkbox"/> OUTGOING
NAME OF PERSON CONTACT WITH Harold Winters Port Angeles, WA	ORGANIZATION Resident during site usage	TELEPHONE NO. 360-452-2741	
SUBJECT Port Angeles Combat Range			

SUMMARY

Mr. Winters was contacted based on a lead from Harriet Fish noting that Violet Fish Grall was a local during the time the site was active. Violet referred us to her brother, Harold, stating that he knew more about it than she did.

Mr. Winters stated that they fired west/southwest, roughly in the direction of the orchard. He said that there was a block and cable that pulled old tanks across the field for them to fire at until they blew them up. He noted they used anti-tank guns firing 37mm and 75mm. He also recalled use of small arms. When asked about mortars, he had no recollection of mortar use.

As had been the case before, he said that the troops camped at the old fair grounds and came in each day to practice. He too noted that the only buildings associated with the site a latrine. He didn't remember any barracks or mess hall, but did recall there was an old root house and barn by the orchard, along with the old Yerkes homestead that no one lived in.

He stated that to the best of his knowledge they didn't close the road (Deer Park) when firing.

When asked about any contamination, he noted that his brother plowed in the area (not specifically defined) and never hit anything.

ACTION REQUIRED
NONE

ACTION TAKEN

NAME OF PERSON DOCUMENTING COVERSATION Mary Jo Civis	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER 309-794-6010
SIGNATURE <i>Mary Jo Civis</i>	TITLE QASAS	DATE 7-28-94

I-7

CONVERSATION RECORD		TIME AM	DATE 28 Jul 1994
TYPE			
<input checked="" type="checkbox"/> VISIT		<input type="checkbox"/> CONFERENCE	<input type="checkbox"/> TELEPHONE
			<input type="checkbox"/> INCOMING
			<input type="checkbox"/> OUTGOING
NAME OF PERSON CONTACT WITH Jack Wad & Grant Beck Lincoln St. Port Angeles, WA 98362		ORGANIZATION County Extension Office	TELEPHONE NO. 360-417-2279
SUBJECT Port Angeles Combat Range			

SUMMARY

Mr. Wad and Mr. Beck provided the team with information on historical and cultural resources that pertain to the subject site.

Mr. Beck provided a map that showed a wetlands area w/i the site. He also examined their maps and information on endangered species and indicated that there are none specifically sited within the site. He also indicated there appears to be no defined wildlife habitat that is protected.

Generally, Mr. Beck noted that a large majority of the wooded area w/i the site is subject to erosion control w/ a high landslide hazard.

He also explained the 3 site creeks and their locations as follows:

Frog Creek - class 2/type 4 stream
 Surveyor Creek - class 2/type 3 stream
 Morse Creek - class 1/type 1 stream

The reference used to define these classifications was also given to the SI team.

ACTION REQUIRED
 NONE

ACTION TAKEN

NAME OF PERSON DOCUMENTING COVERSATION Mary Jo Civis	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER 309-794-6010
SIGNATURE <i>Mary Jo Civis</i>	TITLE QASAS	DATE 7-28-94

CONVERSATION RECORD		TIME AM	DATE 28 Jul 1994
TYPE			
<input checked="" type="checkbox"/> VISIT		<input type="checkbox"/> CONFERENCE	<input type="checkbox"/> TELEPHONE <input type="checkbox"/> INCOMING <input type="checkbox"/> OUTGOING
NAME OF PERSON CONTACT WITH Jane Hendrick and Paul Gleeson 3002 Mt. Angeles Rd Port Angeles, WA 98362	ORGANIZATION National Park Service	TELEPHONE NO. 360-452-4510/ 0316	
SUBJECT Port Angeles Combat Range			

SUMMARY

Mary Jo Civis and Karen Beachler met with Ms. Hendrick and Mr. Gleeson at the Park. The portion of the Park that was a part of the former site was pointed out on a map. Ms. Hendrick and Mr. Gleeson were both unaware that any portion of the Park had been a part of a practice range.

When asked if they had any information on ordnance finds in the area Ms. Hendrick said no. She pointed out that this portion of the park is fairly rough terrain and that the only time she believed the area would be entered by people was during the 2 months of deer hunting season. She noted that the deer population is small however, and guessed that maybe we would be talking 8-10 hunters/wk at most.

When asked about the resources w/i the area, Mr. Gleeson stated that there is no good comprehensive search. He noted that the Elwah Indians may have traversed the area which could mean artifacts may exist, even though none have been confirmed.

In our discussion of endangered species, Mr. Gleeson pointed out that the Marrbled Mirrullette has just been added to the list. He explained that while this is a shore bird, it nests inland. However, he also stated that they're still trying to figure out exactly where they nest.

Ms. Hendrick requested that if our research determined there was any contamination, we send her maps of the area and types of ordnance. The team agreed to do this.

ACTION REQUIRED

Mail information on firing fans/ordnance if/as appropriate.

ACTION TAKEN

NAME OF PERSON DOCUMENTING COVERSATION Mary Jo Civis	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER 309-794-6010
SIGNATURE <i>Mary Jo Civis</i>	TITLE QASAS	DATE 7-28-94

CONVERSATION RECORD		TIME 3:00 PM	DATE 24 July 1996
TYPE			
<input type="checkbox"/> VISIT		<input type="checkbox"/> CONFERENCE	<input checked="" type="checkbox"/> TELEPHONE <input type="checkbox"/> INCOMING <input checked="" type="checkbox"/> OUTGOING
NAME OF PERSON CONTACT WITH Mr. Jake Benshoof	ORGANIZATION Former member of the 115th Cavalry (1942)	TELEPHONE NO. (503) 286-3453	
SUBJECT Port Angeles Combat Range			

SUMMARY

Mr. Benshoof was a member of the 115th Cavalry during the time Port Angeles was active. When asked, he noted that he was not familiar with the combat range south of Port Angeles. He stated he spent most of his time patrolling around the coast.

When I explained what I already knew about the use of the site and what I was trying to confirm, he volunteered some info concerning the TO&E of the 115th, and explained that in 1941 the organization reverted from National Guard to active Army. He further cited that during the time frame in question there were a lot of changes and most of records were lost (or basically just not maintained by the National Guard). He stated that he had a good history of the 115th already prepared and volunteered to send it to me to see if it would give me any insight or leads.

I explained that one key thing I was trying to sort out was what ammunition was actually used at the site. He told me the ammo he remembers having on hand during that time was 75mm, 37mm, .45 cal., .50 cal, and .30 cal. He referenced this in relation to the weapons on hand at the time and stated this would have been about Nov '42. When I noted that an old EOD clearance stated that fins from 81mm mortars had been recovered he said they never had mortars and suggested that that was from a Guard unit or maybe the 41st Infantry Division that he knew was near the area at the time.

When I noted the fact that we had documented evidence of 37mm HE on site, he was surprised and stated that the 115th occasionally used AP, but rarely HE for training. It was mostly practice.

I asked Mr. Benshoof if he had any other contacts that were in the 115th during this time frame that I might be able to contact. As he is a member of the Cavalry Association and is responsible for maintaining the organizations news letter, he said he would go through his records and see what he could find.

At the close of the conversation, Mr. Benshoof took my address and fax number and promised to get the information to me.

ACTION REQUIRED

Contact individuals on faxed info when received.

ACTION TAKEN

NAME OF PERSON DOCUMENTING COVERSATION	ORGANIZATION	TELEPHONE NUMBER
Mary Jo Civis	CENCR-ED-DO	309-794-6010
SIGNATURE	TITLE QASAS	DATE 7-24-96

Mary Jo Civis

CONVERSATION RECORD		TIME PM	DATE 29 Jul 1996
TYPE			
<input type="checkbox"/> VISIT		<input type="checkbox"/> CONFERENCE	<input checked="" type="checkbox"/> TELEPHONE
			<input type="checkbox"/> INCOMING
			<input checked="" type="checkbox"/> OUTGOING
NAME OF PERSON CONTACT WITH Ron Baron	ORGANIZATION Son of Mickey Baron, area resident	TELEPHONE NO. 360-452-7218	
SUBJECT Port Angeles Combat Range			

SUMMARY

Ms. Mary Jo Civis contacted Mr. Baron at his home. Mr. Baron's mother had indicated that he had found rounds in the woods and may have some info for us.

Mr. Baron stated that what he had found was small arms. He said that one time he found a shell that was larger but wasn't sure exactly what type it was. He would guess it was in the ball park of 40mm. He noted that someone was with him at the time that knew something about ammo so he knew it wasn't live. As for the exact location he wasn't quite sure anymore. He noted things have overgrown since then, as this was about 20 or 25 years ago. When asked if he remembered any general location, i.e., east, west, etc., he said that it was far south of the cleared area.

He said there are a lot of .30 '06 embedded in the tree stumps. Figured you could go there now and still find them if you really wanted to.

He didn't have much other information about the site, but recommended contacting a Louie Tucker. Said he was an old-timer in the area during site usage and could probably give me some good info.

ACTION REQUIRED

Call Louie Tucker

ACTION TAKEN

Found Phone number for Lewis Tucker on the net and called him.

NAME OF PERSON DOCUMENTING COVERSATION Mary Jo Civis	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER 309-794-6010
SIGNATURE <i>Mary Jo Civis</i>	TITLE QASAS	DATE 7-29-96

I-11

CONVERSATION RECORD		TIME PM	DATE 29 Jul 1996
TYPE			
<input type="checkbox"/> VISIT		<input type="checkbox"/> CONFERENCE	<input checked="" type="checkbox"/> TELEPHONE
			<input type="checkbox"/> INCOMING
			<input checked="" type="checkbox"/> OUTGOING
NAME OF PERSON CONTACT WITH Lewis Tucker 80 John Jacobs Road Port Angeles, WA 98362-9241		ORGANIZATION Area resident during former site usage	TELEPHONE NO. 360-452-2685
SUBJECT Port Angeles Combat Range			

SUMMARY

Ms. Mary Jo Civis contacted Mr. Tucker at his home. He was familiar with the subject range, but noted that he was not actually there during its usage because he was in the army.

He said he never found anything in the area himself, but that was because he was smart enough to stay out of the area. He recalled that signs were once posted, but wasn't sure if they were still around.

He recalled the 2 boys being killed, but didn't know too many other particulars about the site.

When asked if he knew what was fired there, he thought 155mm and 105mm, but wasn't really sure. He did state that he was pretty sure they only fired on the west side of the road though.

ACTION REQUIRED

NONE

ACTION TAKEN

NAME OF PERSON DOCUMENTING COVERSATION Mary Jo Civis	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER 309-794-6010
SIGNATURE <i>Mary Jo Civis</i>	TITLE QASAS	DATE 7-29-96

CONVERSATION RECORD	TIME PM	DATE 19 Aug 1996
---------------------	------------	---------------------

TYPE

☐ VISIT

☐ CONFERENCE

☒ TELEPHONE
☐ INCOMING
☒ OUTGOING

NAME OF PERSON CONTACT WITH Thomas Tinkham 1091 Mt. Pleasant Road Port Angeles, WA	ORGANIZATION Friend of Swagerty boys/local excavator	TELEPHONE NO. (360) 457-6270
---	---	---------------------------------

SUBJECT

Port Angeles Combat Range

SUMMARY

Mr. Tinkham grew up with Howard and Homer Swagerty. He also does land clearing in the local area (Mt. Pleasant Sand and Gravel Co.).

Mr. Tinkham was asked what he knew about the direction of fire at the former range. He replied that because he had done some excavating for a Mr. Schreiner who lived on the east side of the road and knew where the Swagertys were killed, they must have fired on the east side of the road toward the west. He was aware of the restriction on the Schreiner property. He stated that he did not find any ordnance related items while doing the work on the Schreiner property.

When I asked if he knew for a fact that they fired across the road, he said no, he had basically assumed that because of the deed restriction and accident location. He said he really didn't remember first hand.

He recommended calling the O'Neals. He said they lived in the area. He said their father, who lived there all his life had passed away recently, but his boys would probably know.

When asked if he has heard of any ordnance being found in the area since the Swagerty accident, he said no and again said the O'Neals would probably know the answer to that too.

ACTION REQUIRED

None (Frank O'Neal already contacted)

ACTION TAKEN

NAME OF PERSON DOCUMENTING COVERSATION Mary Jo Civis	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER 309-794-6010
SIGNATURE	TITLE QASAS	DATE 19 Sep 96

Mary Jo Civis

CONVERSATION RECORD		TIME	DATE 19 Aug '96
TYPE			
<input type="checkbox"/> VISIT		<input type="checkbox"/> CONFERENCE	<input checked="" type="checkbox"/> TELEPHONE <input type="checkbox"/> INCOMING <input checked="" type="checkbox"/> OUTGOING
NAME OF PERSON CONTACT WITH Emanuel Schmidt 2060 Buchanan St. Mt. Vernon, WA 98273	ORGANIZATION Former 115 th Cavalry member (1942)	TELEPHONE NO. 360-856-1906	
SUBJECT Port Angeles Combat Range			
SUMMARY			

Mr. Schmidt was contacted at his home regarding information on the subject range. When asked about the site, he only had a slight recollection of going to a range in the Port Angeles area. He could remember nothing of the exact location. The only thing he remembered was just going to fire rifles. He never fired anything else there. When asked if he had any recollection of a road that ran into the site (Deer Park Road), he had no idea.

When asked if he knew anyone that may still be alive that may have used the range he said no.

ACTION REQUIRED None		
ACTION TAKEN		
NAME OF PERSON DOCUMENTING COVERSATION Mary Jo Civis	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER 309-794-6010
SIGNATURE <i>Mary Jo Civis</i>	TITLE QASAS	DATE 19 Sep 96

CONVERSATION RECORD		TIME	DATE 19 Aug '96
TYPE			
<input type="checkbox"/> VISIT		<input type="checkbox"/> CONFERENCE	<input checked="" type="checkbox"/> TELEPHONE <input type="checkbox"/> INCOMING <input checked="" type="checkbox"/> OUTGOING
NAME OF PERSON CONTACT WITH Ray Hornby 8125 206 th St. SE Snohomish, WA 98290	ORGANIZATION Former 115 th Cavalry member (1942)	TELEPHONE NO. 360-668-3290	
SUBJECT Port Angeles Combat Range			
SUMMARY			

Mr. Hornby was contacted at his home regarding information on the subject range. When asked about the site, he said that he only spent about a month in Port Angeles and during that time he had never done any range firing. When asked if he knew of anyone else that might have information about the site he said no.

ACTION REQUIRED None		
ACTION TAKEN		
NAME OF PERSON DOCUMENTING COVERSATION Mary Jo Civis	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER 309-794-6010
SIGNATURE <i>Mary Jo Civis</i>	TITLE QASAS	DATE 19 Sep 96

CONVERSATION RECORD		TIME AM	DATE 20 Aug 1996
TYPE			
<input type="checkbox"/> VISIT		<input type="checkbox"/> CONFERENCE	<input checked="" type="checkbox"/> TELEPHONE <input type="checkbox"/> INCOMING <input checked="" type="checkbox"/> OUTGOING
NAME OF PERSON CONTACT WITH Mr. George Welch 170 Aster Casper, WY 82604	ORGANIZATION Former 115th Cavalry member using subject site	TELEPHONE NO. 307-235-4039	
SUBJECT Port Angeles Combat Range			

SUMMARY

Ms. Mary Jo Civis contacted Mr. Welch at his home. He confirmed that he was in fact in 115th and had trained at Port Angeles.

When asked what he could remember about his training there, he stated that they fired 75mm only (howitzer, self propelled). It was all indirect fire based on using coordinates. When asked about the targets, direction of fire, and firing point, he indicated that he couldn't remember a direction of fire, but remembered that once they were 100 degrees (or mils) off and hit a barn to the left.

I asked if he could remember the distance from the firing line to the target or if he recalled whether they fired across a road. He said he didn't remember whether they fired across a road, but replied that there weren't much for roads in the whole area. I then explained about the open field and asked if he remembered if the firing and target occurred in this open area, or if he recalled firing into or out of trees. He said he did recall the clearing and that they fired from it, but reiterated that he couldn't recall a target per say since they just fired from coordinates.

As for distance, he reminded me that it's been a long time, but he felt like it may have been about 1500yds, 'cause he seemed to remember pulling out some of the increments before firing.

When asked what type of rounds they used, he said it was mostly HE, but he thought they used some WP too.

I noted that I had some information that there was a spotting tower on site and asked if he remembered that or any other buildings. He said he didn't remember any spotting tower, and was pretty sure they used forward observers. He further stated that they came in on a daily basis to practice and there were no structures. He noted that they camped somewhere on the outskirts of Port Angeles.

I then mentioned that I knew there was 37mm used at this site and also that a local that grew up during site usage mentioned seeing troops crawling under barbed wire and fox holes. After noting that the only barbed wire fences they crawled under were to get blackberries, he said that he didn't realize anyone else had used the site.

He was able to give me the names and phone numbers of two other persons that were in the 115th that may have more information: Mr. Ronald Geisick, (307) 532-5967 and Mr. Bill Callahan, (360) 533-2942.

ACTION REQUIRED

Contact Geisick

ACTION TAKEN

NAME OF PERSON DOCUMENTING COVERSATION	ORGANIZATION	TELEPHONE NUMBER
Mary Jo Civis	CENCR-ED-DO	309-794-6010
SIGNATURE	TITLE QASAS	DATE 20 Aug '96
Mary Jo Civis		

CONVERSATION RECORD	TIME PM	DATE 20 Aug '96
TYPE		
<input type="checkbox"/> VISIT	<input type="checkbox"/> CONFERENCE	<input checked="" type="checkbox"/> TELEPHONE <input type="checkbox"/> INCOMING <input checked="" type="checkbox"/> OUTGOING
NAME OF PERSON CONTACT WITH Mr. Ronald Geisick 2518 E. D St. Torrington, WY 82240	ORGANIZATION Former 115th Cavalry member-1943	TELEPHONE NO. 307-532-5967
SUBJECT Port Angeles Combat Range		

SUMMARY

Mr. Geisick was contacted at his home. He verified that he was in the 115th Cavalry during WW II and had trained at the subject site for about a month or so.

He stated that during his training at the site they only used 37mm. He said they did both direct and indirect firing. They camped at the Conservation Corps Camp outside Port Angeles and came in each day to fire.

When asked about direction and location of fire, he wasn't real sure, but thought it was somewhat east to west. But he also noted that he didn't fire across the road.

In terms of target specifics, he recalled both moving and stationary targets. He noted they pulled an old tank across the field on a block and tackle for direct firing. He guessed at maybe 500 or 600 yds. He said that when they did direct firing, sometimes they lined up 19 tanks at the firing line and they all fired together. It was different for indirect firing, they used coordinates.

In an effort to establish a target area, I asked if he recalled an old barn or orchard in relation to the target and he said no.

I told him that a local had told me they entered the site through the fence along the road and set up their firing line fairly near the entry point. I asked if this sounded like what he remembered and he said yes.

I also told him that someone had mentioned troops crawling under barbed wire fences and fox holes. He said they never did that and suggested that maybe an infantry

unit was there. I indicated that I considered that and asked what unit may have been in the area at the time. He suggested the 30th Infantry at Ft. Lewis.

When asked about the spotting tower or other buildings, he said he didn't really remember the tower and that there weren't any other buildings that he could remember.

When asked about the type of ammo used, he said they used mostly ball (TP), and maybe AP once just to get the feel of it. He said he doesn't remember ever using HE.

ACTION REQUIRED

NONE

ACTION TAKEN

NAME OF PERSON DOCUMENTING COVERSATION	ORGANIZATION	TELEPHONE NUMBER
Mary Jo Civis	CENCR-ED-DO	309-794-6010
SIGNATURE	TITLE QASAS	DATE 20 Aug '96

Mary Jo Civis

CONVERSATION RECORD		TIME	DATE 16 Oct 1994
TYPE			
<input type="checkbox"/> VISIT		<input type="checkbox"/> CONFERENCE	<input checked="" type="checkbox"/> TELEPHONE <input type="checkbox"/> INCOMING <input checked="" type="checkbox"/> OUTGOING
NAME OF PERSON CONTACT WITH Frank O'Neal	ORGANIZATION Local resident	TELEPHONE NO. (360)	
SUBJECT Port Angeles Combat Range			
SUMMARY			

Mr. O'Neal was contacted by Karen Beachler.

The O'Neal family has owned land in the area since before the Port Angeles Combat Range was in use. Mr. O'Neal stated that what looks like a bunker on their property is really a tank for irrigation.

He stated that the firing occurred on the west side of the road and they fired to the south. He has found bullets and pieces of metal south and west of the orchard. He stated that he and the Baron's boy were friends and did a lot of scouting and digging in the area. He said that only the older trees were affected by ammo.

ACTION REQUIRED
None

ACTION TAKEN

NAME OF PERSON DOCUMENTING COVERSATION Mary Jo Civis for Karen Beachler	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER 309-794-6010
SIGNATURE <i>Mary Jo Civis</i>	TITLE QASAS	DATE 19 Sep 96

Subject: Table of Organization and Equipment (TO & E) for 115th Cavalry, Wyoming National Guard

Contact: Mr. William Callahan
118 W. Emerson St.
Hoquiam, WA 98550

Phone: 360-533-2942

Mr. William Callahan, a half-track commander and member of 115th cavalry, WY National Guard was contacted regarding the composition of this unit at the time it utilized the Port Angeles Training Area. He confirmed that the vehicles issued to the 115th included Carriage, Motor, 75mm Howitzer, M8, Tank, Light, M3 and Tank, Light, M5. The weapons mounted on the light tanks included 37mm guns, as well as caliber .30 machine guns. This information supports the TO & E provided by the Patton Museum of Cavalry and Armor in their letter of 11 October 1994, subject: TO & E for 115th Cavalry, WY National Guard.



George R. Williams
Technical Manager

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR THE FORMER
PORT ANGELES COMBAT RANGE
PORT ANGELES, WASHINGTON
PROJECT NUMBER F10WA003301

APPENDIX J

PRESENT SITE PHOTOGRAPHS

APPENDIX J

PRESENT SITE PHOTOGRAPHS

Table of Contents

- J-1 Photo taken from Olympic Park/Mountain showing overall vicinity
- J-2 North perimeter of area A-1 not far from southern limit of area A-2.
- J-3 Photo taken from southeast portion of area A-2 looking northwest through areas C-2 and D.
- J-4 Photo taken in middle of open field (area C-2) looking south into area A-2.
- J-5 Possible ordnance entry hole found in area A-2.
- J-6 Possible ordnance entry holes found in area A-2.
- J-7 Photo taken along road in area B.
- J-8 Photo taken a short way from the road, in general vicinity where areas C-2, E and F meet, noting warning signs.
- J-9 Canyon on western edge of area D looking toward area E.
- J-10 Photo taken on Deer Park Road looking north along area D near area C-2.
- J-11 Looking south at entry point through barbed wire fence into area D.
- J-12 Warning sign along Deer Park Road near area D.
- J-13 Photo taken around southern portion of area D and looking north toward area E.
- J-14 Photo taken on Diehl property in area E.



J-1 Photo taken from Olympic Park/Mountain showing overall vicinity. Port Angeles Combat Range in distance.



J-2 North perimeter of area A-1 not far from southern limit of area A-2. Beginning of dense forest area.



J-3 Photo taken from southeast portion of area A-2 looking northwest through areas C-2 and D. Wetland grasses can be noted on lower portion of photo.



J-4 Photo taken in middle of open field (area C-2) looking south into area A-2. Four fruit trees believed to be remains of old orchard.



J-5 Possible ordnance entry hole found in area A-2. Approximately 2 or 3 inches in diameter.



J-6 Possible ordnance entry holes found in area A-2. Overlapping and ranging from 1 to 4 inches in diameter.



J-7 Photo taken along road in area B. Dense tree growth limits access to the area.



J-8 Warning signs posted a short way from the road, in general vicinity where areas C-2, E and F meet.



J-9 Canyon on western edge of area D looking toward area E. Approximate 250 foot drop down to Surveyor Creek.



J-10 Deer Park Road looking north along area D near area C-2. Barbed wire fence restricts public access.



J-11 West edge of Deer Park Road looking south through barbed wire fence into area D. Loose rail serves as point of entry into open field.



J-12 Warning sign posted along Deer Park Road near area D.



J-13 Looking north toward area E from southern portion of area D.



J-14 Old foundation on Diehl property in area E. Dense tree growth throughout the area.

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR THE FORMER
PORT ANGELES COMBAT RANGE
PORT ANGELES, WASHINGTON
PROJECT NUMBER F10WA003301

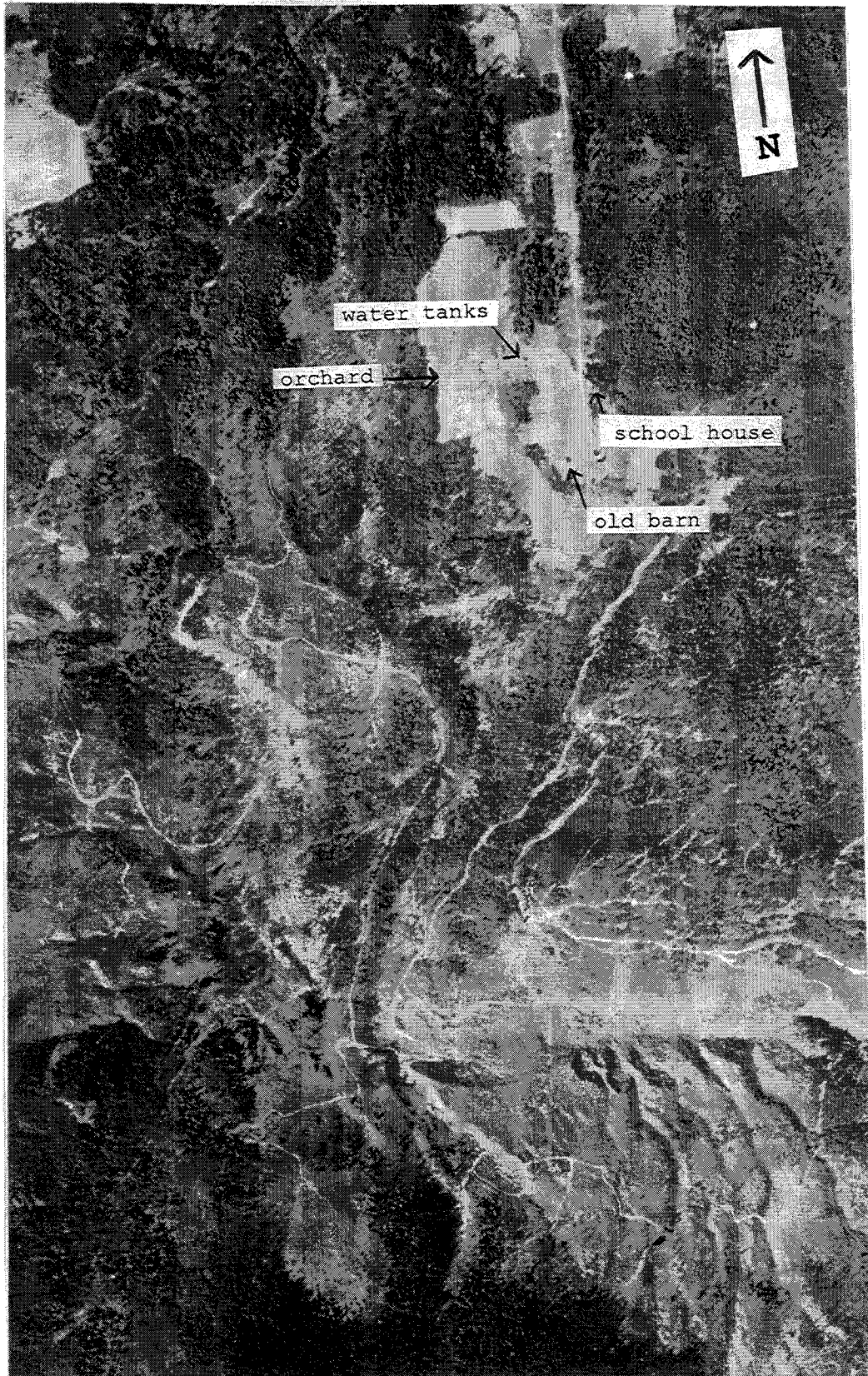
APPENDIX K
HISTORICAL PHOTOGRAPHS

APPENDIX K

HISTORICAL PHOTOGRAPHS

Table of Contents

K-1 1939 Aerial Photo of Site (B-51)



1939 Aerial Photograph

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR THE FORMER
PORT ANGELES COMBAT RANGE
PORT ANGELES, WASHINGTON
PROJECT NUMBER F10WA003301

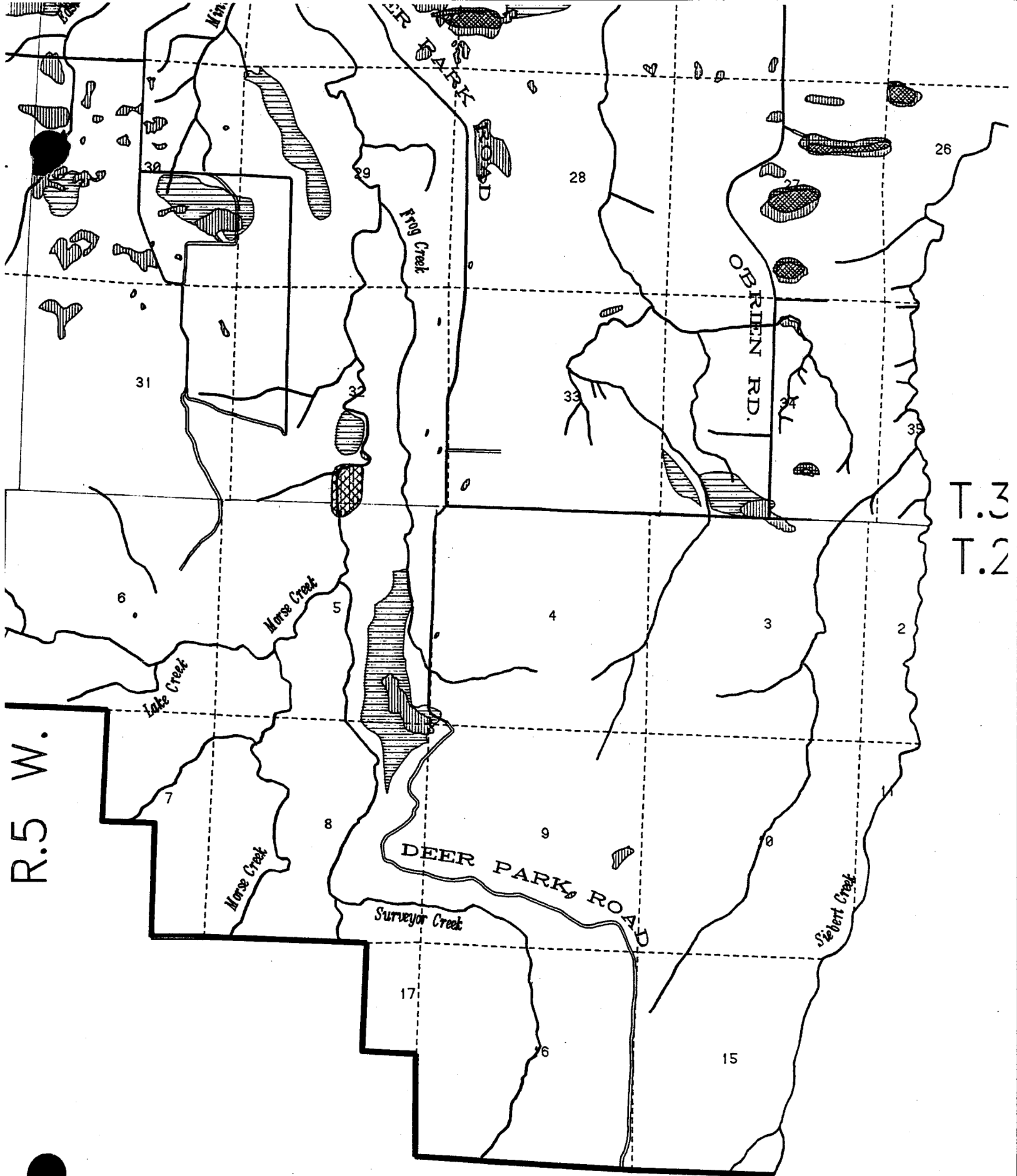
APPENDIX L

APPENDIX L

REFERENCE MAPS/DRAWINGS

Table of Contents

- L-1 Sketch of City of Port Angeles property. (B-52)
- L-2 Sketch of area wetlands. (B-53)
- L-3 Site map dated 1948. (B-54)
- L-4 Site map dated 1958. (B-55)



*Note: This map provides an approximate location and boundary of wetlands and hydric soils for planning, not regulatory purposes. It does not identify all wetlands. A small ver-

3	Mackenhimer (Owner), Owens (Lessee)	80.00	"	16 Sept. 1948
4	Elbert T. and Helen K. Little	40.00	"	20 Sept. 1948
5	J. E. and Edith Yarkes	160.00	"	20 Sept. 1948
6	Olympic National Park	560.00	"	22 Sept. 1948
7	David Burroughs Et. Ux.	80.00	"	8 Oct. 1948



STATE INDEX

COUNTY: WASHINGTON
DIVISION: NORTH PACIFIC
DISTRICT: SEATTLE
SIXTH ARMY AREA

— LOCATION OF PROJECT —
8 MILES SE OF PORT ANGELES
MILES OF:

— TRANSPORTATION FACILITIES —
RAILROADS: C.M. & ST. P. & P.
STATE ROADS: 9, 9A
FEDERAL ROADS: 101
AIRLINES:

— ACQUISITION —
TOTAL ACRES ACQUIRED: 1600
ACRES FEE:
ACRES TRANS'D TO WAR DEPT.
ACRES LEASED TO WAR DEPT.
ACRES LESSER INTERESTS: 1600

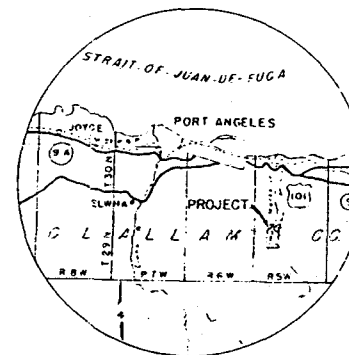
— DISPOSAL —
TOTAL ACRES DISPOSED OF:
ACRES SOLD BY WAR DEPT.
ACRES TRANS'D BY WAR DEPT.
ACRES RETRANS'D TO GOV'T. AGCY.
ACRES LEASES TERMINATED:
ACRES LESSER INT'S. TERM:

— LEGEND —
NOTE: USE SYMBOLS FROM FM-21-30 (WAR DEPT. BASIC FIELD MANUAL) PAGES 21 TO 27 INCL EXCEPT

RESERVATION LINE: ---
RESERVATION LINE (ACTUAL SURVEY): ---
DAM SITE (EARLY LINES): ---
RESERVOIR SITE (EARLY LINES): ---
CONTOUR LINES: ---
AVIGATION EASEMENTS: ---
TRACT NUMBER: 99

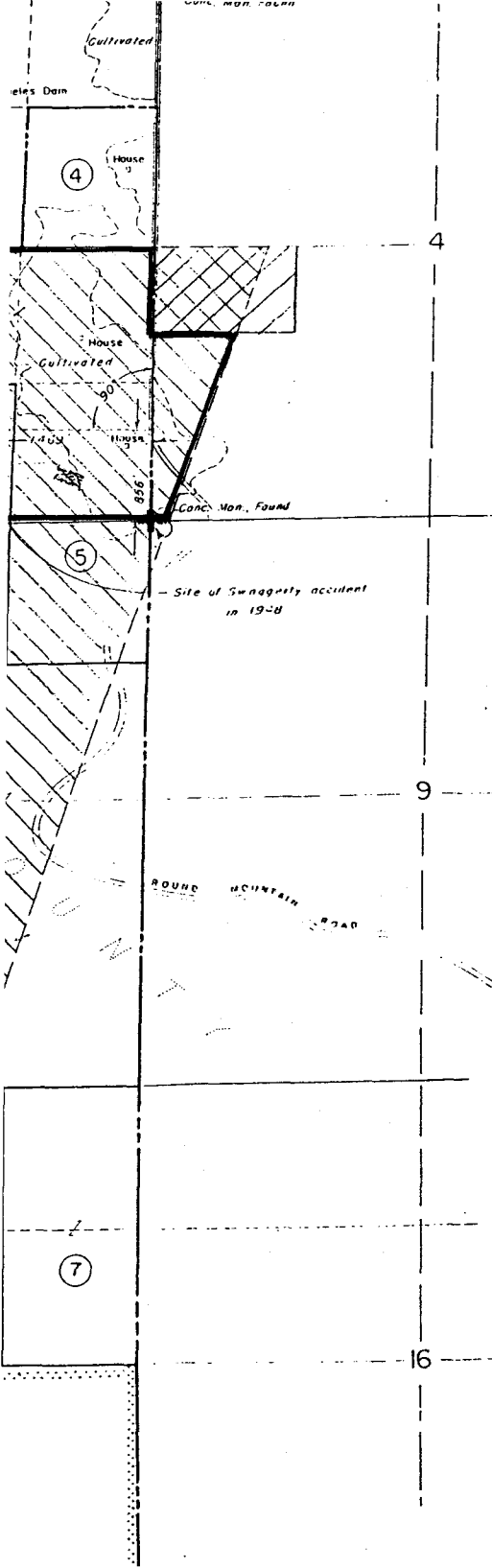
NOTE:
Exploration Permits Expire three months from date.

AREA OF GREATEST CONTAMINATION
 AREA OF LEAST CONTAMINATION
 PROP. OF CHARLES E. JIRIKOWIC
 AREA OF HEAVY CONTAMINATION COVERED BY PRIOR AND PRESENT CERTIFICATES OF CLEARANCE



VICINITY MAP

0 6 12
SCALE IN MILES

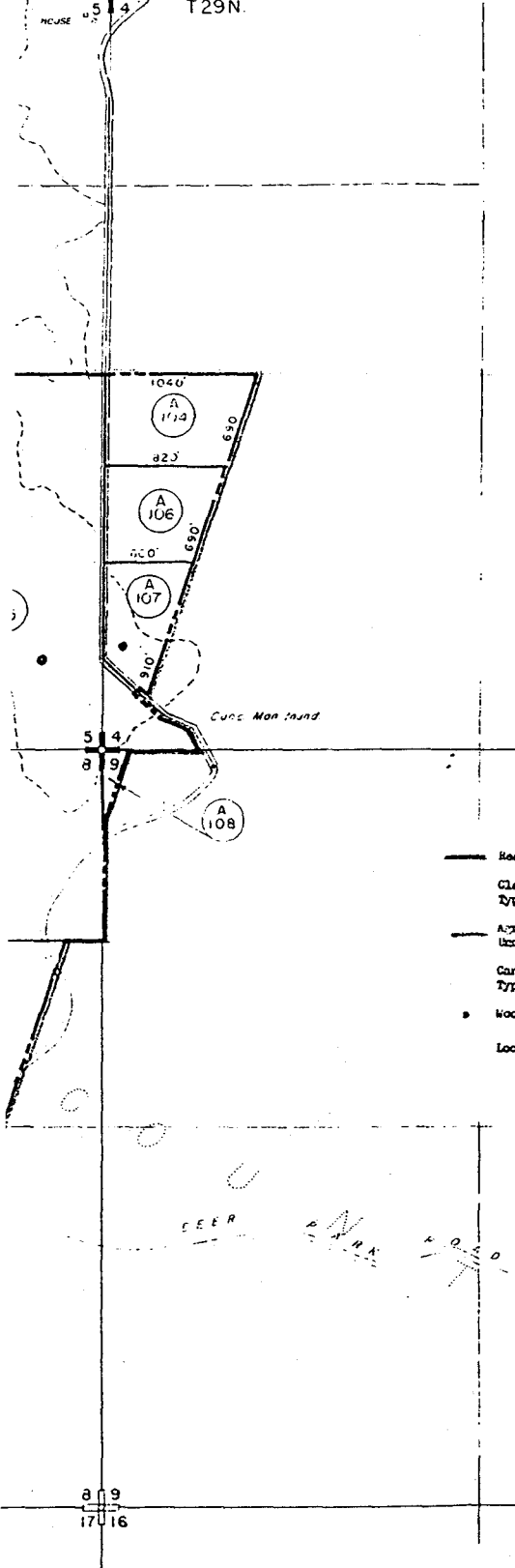


REVISIONS	DATE	BY
1	28 Sept 53	Added information concerning Swagerty accident.

DEPARTMENT OF THE ARMY
OFFICE OF THE DISTRICT ENGINEER
SEATTLE DISTRICT

DRAWN BY: L.F.
TRACED BY: L.F.
CHECKED BY: F.M.
SUBMITTED BY: J.A. D. [Signature]

REAL ESTATE
COMBAT TARGET RANGE
PORT ANGELES, WASHINGTON



AUTH	NO.	LAND
2	A-100E	City of Port Angeles
184	A-101	Milwaukee Land Company
3	A-102	Fred W Mochenheimer et ux
184	A-103	Peninsula Plywood Corporation
184	A-104	Charles Jirikovic et ux
184	A-105	Ray H Petersen et ux
184	A-106	Crown Zellerbach Corporation
184	A-107	Harry C Miles et ux
184	A-108	William Robert Foreman, Exec. of estate of Edith Yernes

FEE	EASEM.T.	LEASE
350.00	25.00	
80.00		
40.00		
14.10		
125.00		
10.78		
7.12		
0.93		

EASEMENT AND LEASE FOR 30 YEARS FROM 10-31-55
W/DEED 4-23-62, FORMERLY LEASEHOLD
CIVIL NO. 4943
TITLE VESTED IN USA ON 9-17-56 CIVIL NO. 3983
D/T FILED 6-29-62, CIVIL NO. 3612, FORMERLY LEASE NO. DA 45-108 ENG-4738
D/T FILED 6-29-62, CIVIL NO. 3612, FORMERLY LEASEHOLD CIVIL NO. 4943
D/T FILED 6-29-62, CIVIL NO. 3612, FORMERLY LEASEHOLD, CIVIL NO. 4943
D/T FILED 6-29-62, CIVIL NO. 3612, FORMERLY LEASE NO. DA 45-108 ENG-4836
W/DEED 6-21-62, FORMERLY LEASEHOLD, CIVIL NO. 4943
W/DEED 4-16-62, FORMERLY LEASE NO. DA 45-108 ENG-4216

AGENCY: DEPT OF THE ARMY
USING SERVICE CONTINENTAL ARMY COMMAND
STATE WASHINGTON
COUNTY CLALLAM
DIVISION NORTH PACIFIC
DISTRICT SEATTLE
ARMY AREA SIXTH

LOCATION OF PROJECT

8 MILES SE OF PORT ANGELES
MILES OF

TRANSPORTATION FACILITIES

RAILROADS C M S F & P
STATE ROADS 9, 9A
FEDERAL ROADS 101
AIR LINES

ACQUISITION

TOTAL ACRES ACQUIRED 652.93
ACRES FEE 627.93
ACRES TRANSFERRED
ACRES LEASED
ACRES LESSER INTERESTS Esmt (1) 25.00

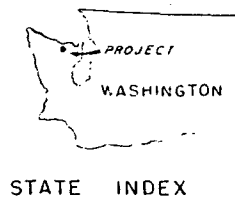
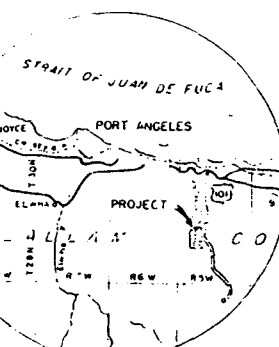
DISPOSAL

TOTAL ACRES DISPOSED OF
ACRES SOLD
ACRES TRANSFERRED
ACRES LEASES TERMINATED
ACRES LESS INT'S TERMINATED
ACRES REASSIGNED
ACRES TO

LEGEND

EXCEPT FOR THE SPECIAL SYMBOLS SHOWN BELOW, MAP SYMBOLS ARE STANDARD IN ARMY MAP SERVICE TECHNICAL MANUAL NO 73

RESERVATION LINE	---
RESERVATION LINE Actual Survey	---
TRACT BOUNDARY LINE	---
TRACT NUMBER	○
AVIGATION EASEMENT	▨
CONTOUR LINE	---
DISPOSAL	▨



T.29N, R.5W, W.M.

NOTE:
The boundary of this installation was compiled from GLO plots and deed descriptions.

5 RE-D 7493A dated 9 July 1963
4 RE-D 7493 dated 15 August 1961
3 Ticker Act 28 USC (3461a)(2) dated 17 Sep 1956
2 43rd Ind OCE (ENGLP) dated 20 October 1955
1 1st OCE (ENGLS) dated 26 Dec. 1954
ACQUISITION AUTHORIZATION (READ UP)

SEGMENT "A"

DISTRICT ENGINEER
U.S. ARMY ENGINEER DISTRICT SEATTLE
NORTH PACIFIC DIVISION

REAL ESTATE

PORT ANGELES COMBAT RANGE

MILITARY RESERVATION

DRAWN BY PH
TRACED BY PH
CHECKED BY
SUBMITTED BY
L. Frazier
CHIEF, CADASTRAL SECTION
RECOMMENDED BY

APPROVED BY

DATE 4 Feb. 1958

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR THE FORMER
PORT ANGELES COMBAT RANGE
PORT ANGELES, WASHINGTON
PROJECT NUMBER F10WA003301

APPENDIX M

ARCHIVE SEARCH REPORT CORRESPONDENCE
(NOT USED)

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR THE FORMER
PORT ANGELES COMBAT RANGE
PORT ANGELES, WASHINGTON
PROJECT NUMBER F10WA003301

APPENDIX N
REPORT DISTRIBUTION LIST

APPENDIX N
REPORT DISTRIBUTION LIST

	I	II	III
Commander, U.S. Army Corps of Engineers Engineering and Support Center, Huntsville ATTN: CEHNC-OE-AI (Mardis) P.O. Box 1600 Huntsville, Alabama 35807-4301	2	-	-
Commander, U.S. Army Corps of Engineers North Central Division ATTN: CENCD-PP-PM 111 North Canal Street, 12th Floor Chicago, Illinois 60606-7206	1	-	-
Commander, Defense Ammunition Center ATTN: SIOAC-ES Savanna, Illinois 61074-9639	3	-	-
Commander, U.S. Army Health Clinic ATTN: MCXM-PMA (Platt) Rock Island Arsenal Rock Island, Illinois 61201	1	-	-
Commander, U.S. Army Corps of Engineers Seattle District ATTN: CENPS-EN-GT-HW (Maas) 333 S.W. 1st Street Portland, Oregon 97208-2946	2	-	-

I - Final Report
II - Findings Report
III - Routed Final Report

No. Copies

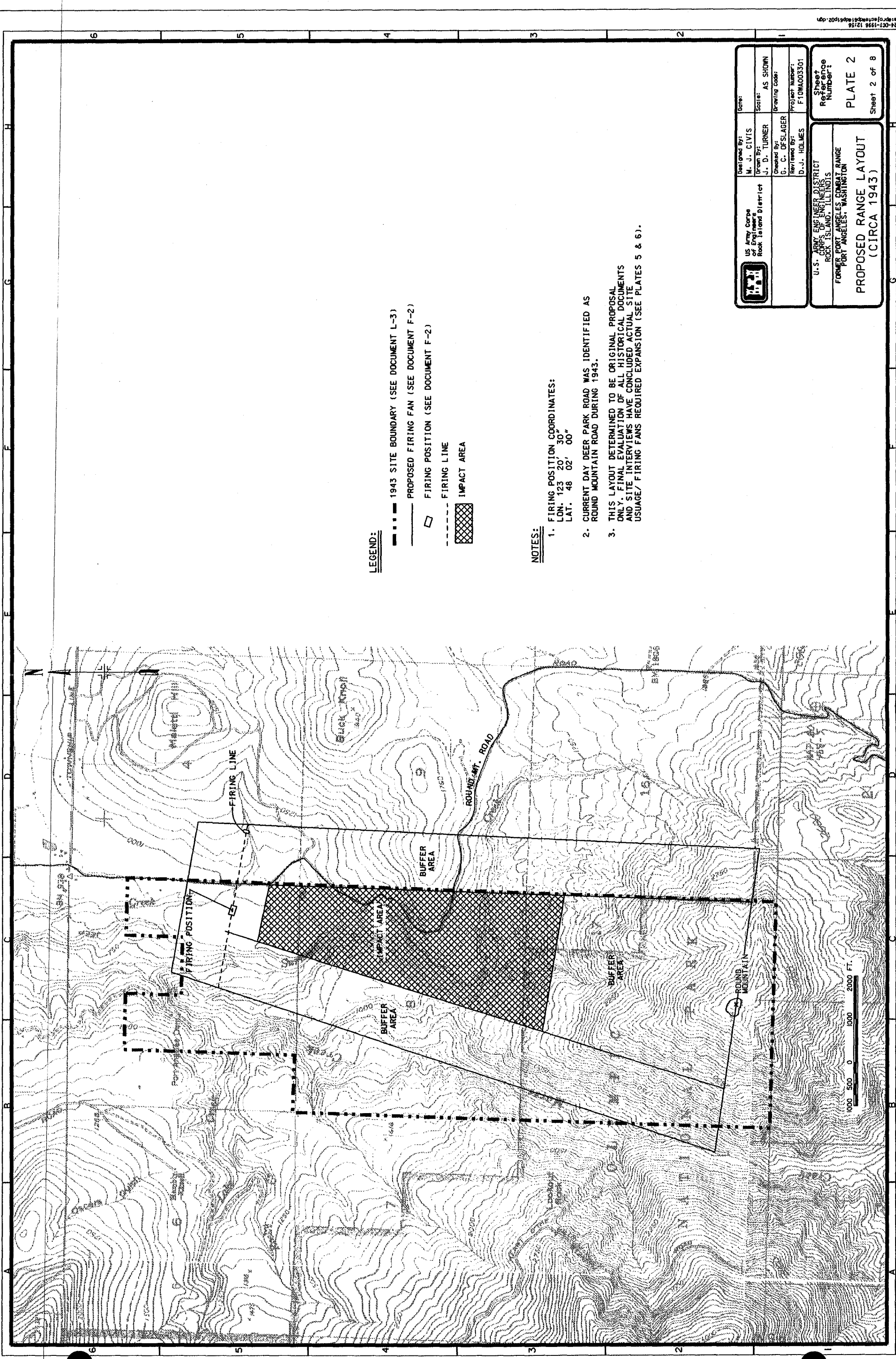
I II III

Commander, U.S. Army Engineer District,
 Rock Island
 P.O. Box 1600
 Rock Island, Illinois 61201

CENCR-ED	-	-	1
-ED-D	-	-	1
-ED-DO	3	-	-

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR THE FORMER
PORT ANGELES COMBAT RANGE
PORT ANGELES, WASHINGTON
PROJECT NUMBER F10WA003301

REPORT PLATES




LEGEND:

- 1943 SITE BOUNDARY (SEE DOCUMENT L-3)
- PROPOSED FIRING FAN (SEE DOCUMENT F-2)
- FIRING POSITION (SEE DOCUMENT F-2)
- FIRING LINE
- ▨ IMPACT AREA

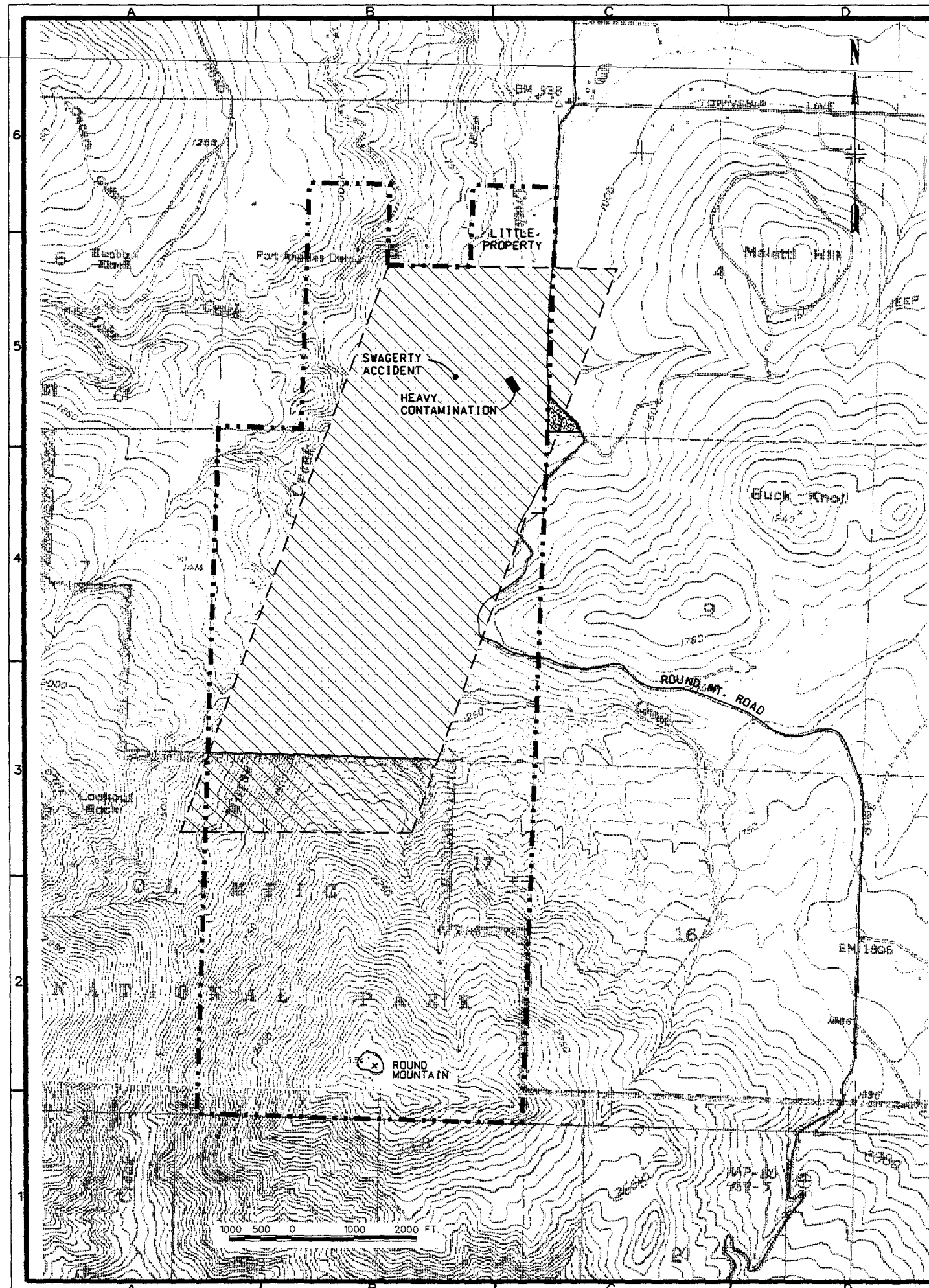
NOTES:

1. FIRING POSITION COORDINATES:
LON. 123° 20' 30"
LAT. 48° 02' 00"
2. CURRENT DAY DEER PARK ROAD WAS IDENTIFIED AS
ROUND MOUNTAIN ROAD DURING 1943.
3. THIS LAYOUT DETERMINED TO BE ORIGINAL PROPOSAL
ONLY. FINAL EVALUATION OF ALL HISTORICAL DOCUMENTS
AND SITE INTERVIEWS HAVE CONCLUDED ACTUAL SITE
USAGE/ FIRING FANS REQUIRED EXPANSION (SEE PLATES 5 & 6).

	U.S. Army Corps of Engineers Rock Island District	Designed By: M. J. CIVIS	Date:
		Drawn By: J. D. TURNER	Scale: AS SHOWN
		Checked By: G. C. DEFLAGER	Drawing Code:
		Reviewed By: D. J. HOLMES	Project Number: F10WA003301

U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS FORMER PORT ANGELES COMBAT RANGE PORT ANGELES, WASHINGTON	Sheet Reference Number: PLATE 2 Sheet 2 of 8
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PROPOSED RANGE LAYOUT
(CIRCA 1943)



O.E. CLEARANCE HISTORY			
AREA	CLEARANCE DATE	ACREAGE	REFERENCE DOCUMENT
	1949	775.0	E-5 & L-3
	1952	10.0*	E-6 & F-6
	1955	1600	E-7
	1956, 1957	0.71	E-8, E-9

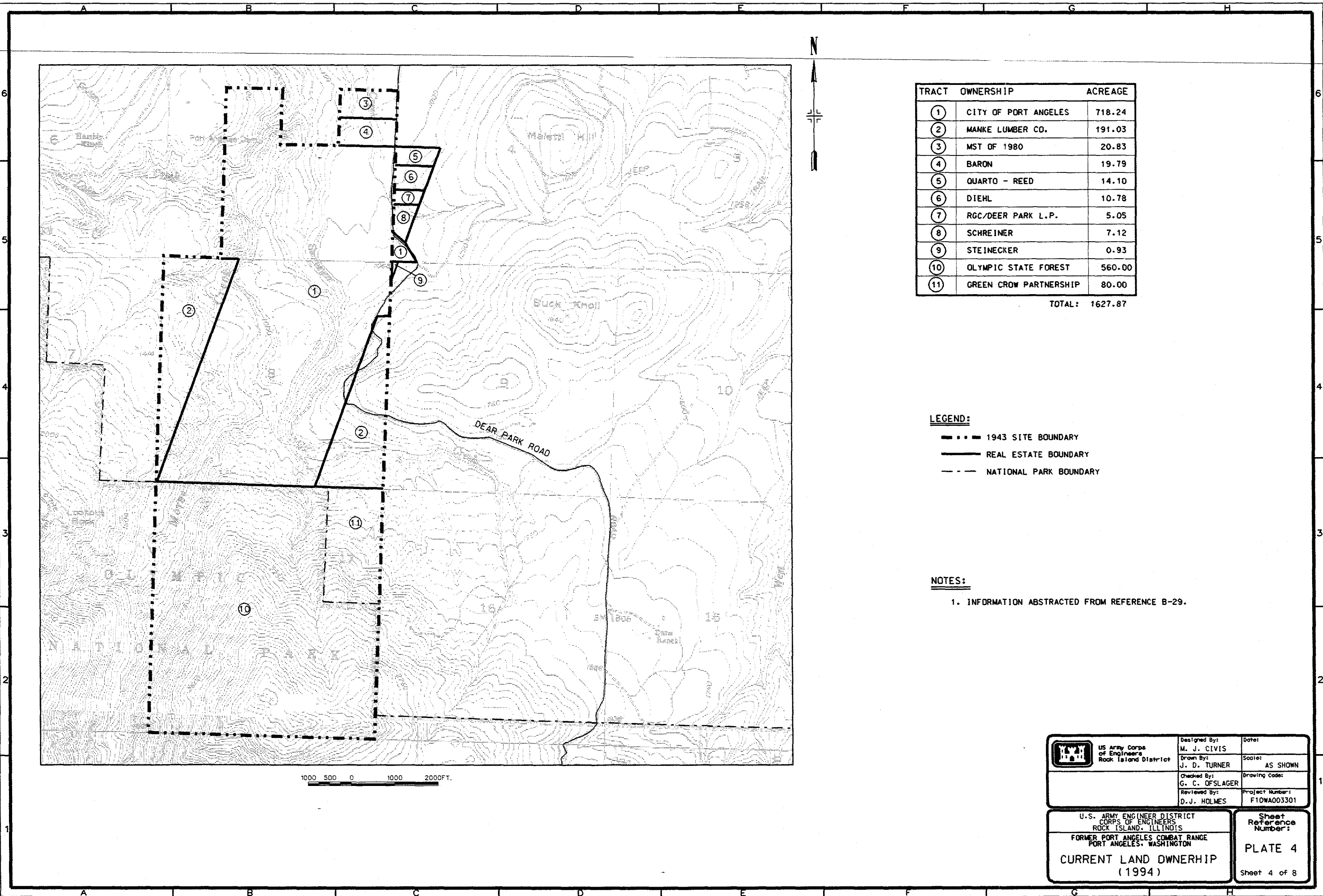
* PRECISE LOCATION NOT VERIFIED.

LEGEND:

- FORMER PORT ANGELES COMBAT RANGE 1943 SITE BOUNDARY
- REVISED "PROBABLE LIMITS OF CONTAMINATION" - 1958.
652 ACRES REPURCHASED BY GOVERNMENT.
(SEE DOCUMENT L-4)
- SWAGERTY ACCIDENT 1948 (SEE DOCUMENTS E-4 & L-3)
- AREA OF HEAVY CONTAMINATION AND PREVIOUS CLEARANCES
(SEE DOCUMENT L-3)

	US Army Corps of Engineers Rock Island District	Designed By: M. J. CIVIS	Date:
		Drawn By: J. D. TURNER	Scale: AS SHOWN
		Checked By: G. C. OFSLAGER	Drawing Code:
		Reviewed By: D. J. HOLMES	Project Number: F10WA003301
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS FORMER PORT ANGELES COMBAT RANGE PORT ANGELES, WASHINGTON		Sheet Reference Number: PLATE 3 Sheet 3 of 8	

16-537-108-1013
enap/estmap/plate3.pdf



TRACT	OWNERSHIP	ACREAGE
①	CITY OF PORT ANGELES	718.24
②	MANKE LUMBER CO.	191.03
③	MST OF 1980	20.83
④	BARON	19.79
⑤	QUARTO - REED	14.10
⑥	DIEHL	10.78
⑦	RGC/DEER PARK L.P.	5.05
⑧	SCHREINER	7.12
⑨	STEINECKER	0.93
⑩	OLYMPIC STATE FOREST	560.00
⑪	GREEN CROW PARTNERSHIP	80.00


TOTAL: 1627.87

LEGEND:

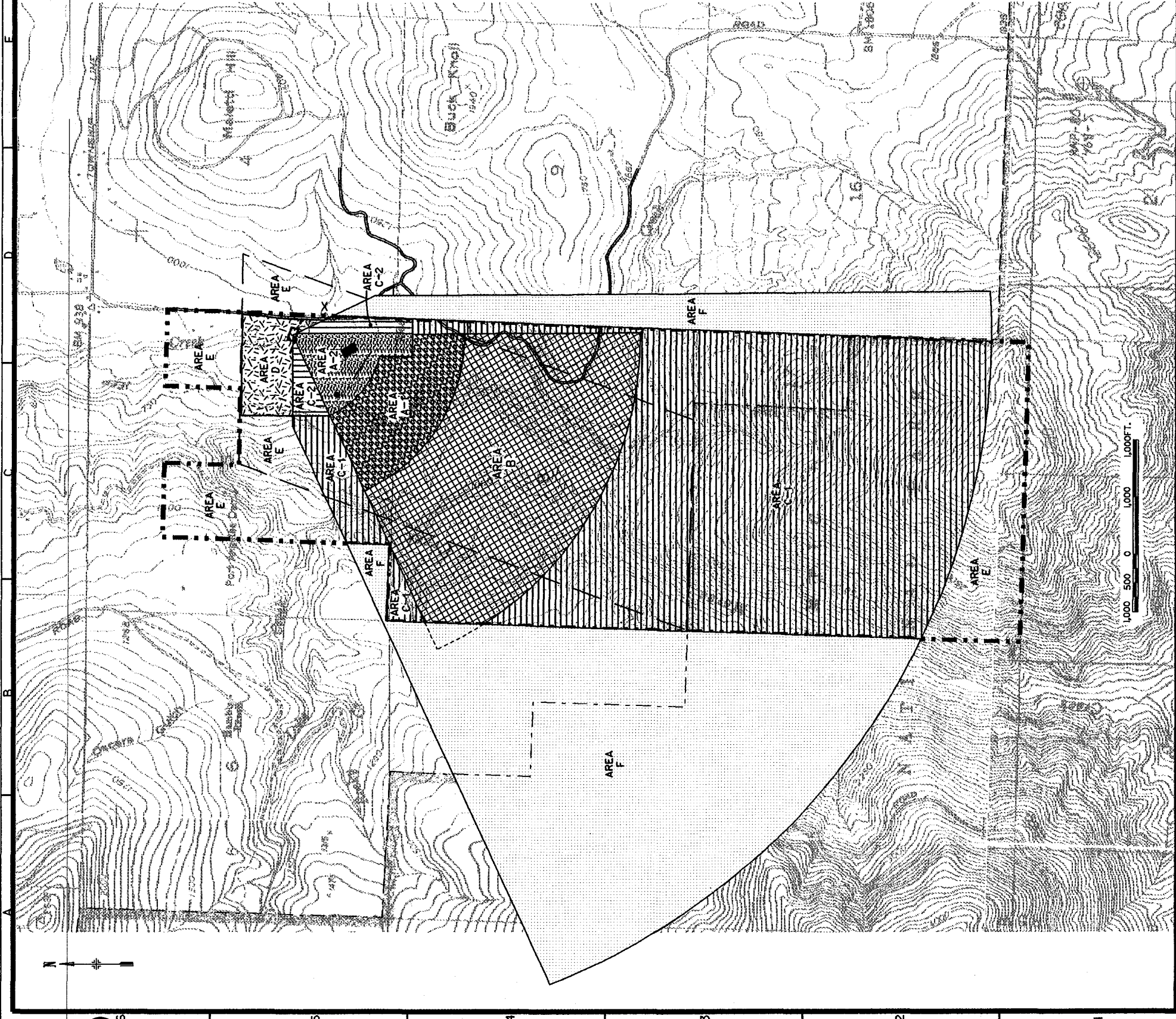
- - - 1943 SITE BOUNDARY
- REAL ESTATE BOUNDARY
- . - NATIONAL PARK BOUNDARY

NOTES:

- 1. INFORMATION ABSTRACTED FROM REFERENCE B-29.

	US Army Corps of Engineers Rock Island District	Designed By: M. J. CIVIS	Date:
		Drawn By: J. D. TURNER	Scale: AS SHOWN
		Checked By: G. C. OFSLAGER	Drawing Code:
		Reviewed By: D. J. HOLMES	Project Number: F10WA003301
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS		Sheet Reference Number:	
FORMER PORT ANGELES COMBAT RANGE PORT ANGELES, WASHINGTON		PLATE 4	
CURRENT LAND OWNERSHIP (1994)		Sheet 4 of 8	

1000 500 0 1000 2000 FT.

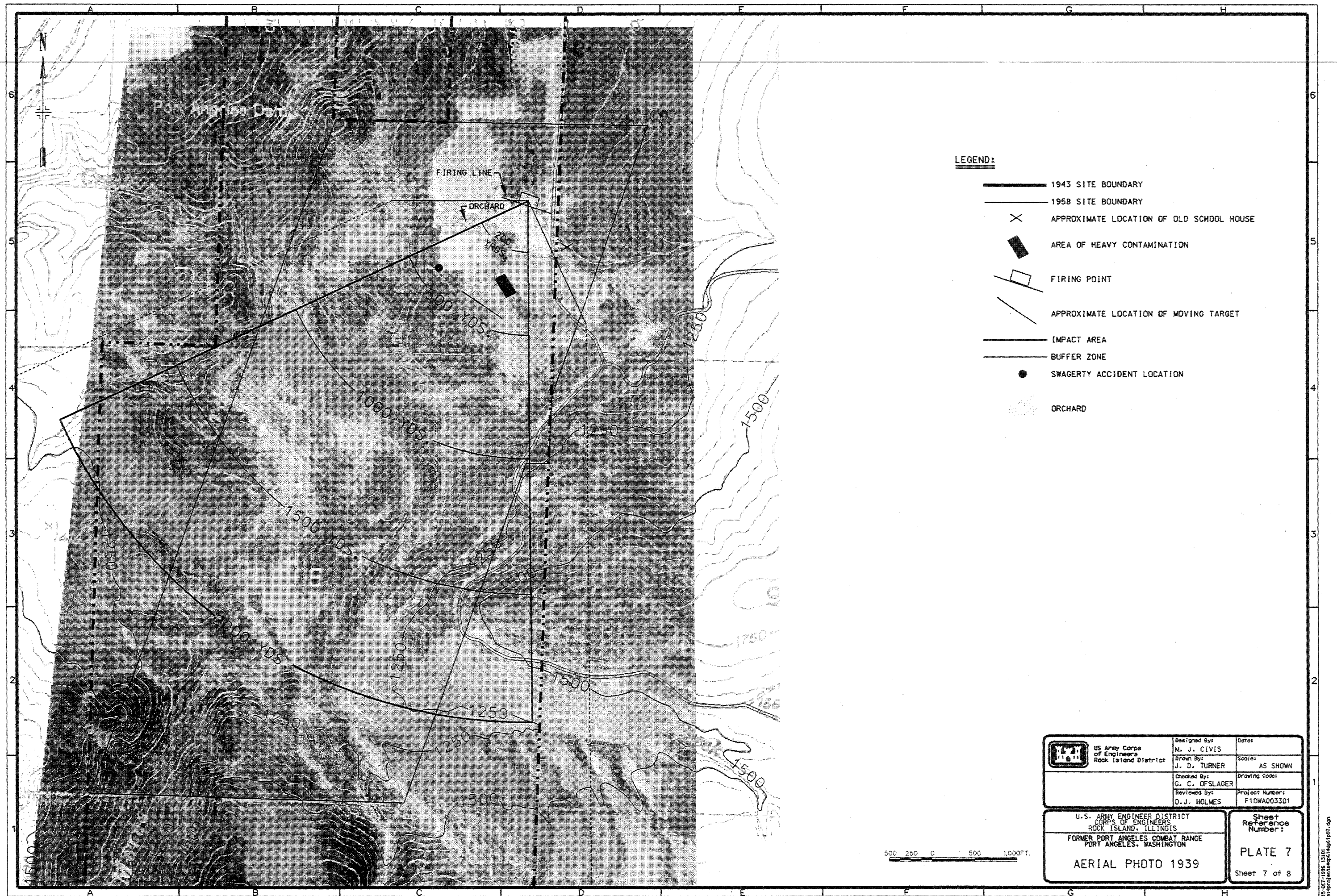


D. E. PROJECT SUMMARY			
AREA	FORMER USAGE	D. E. PRESENCE	ACREAGE
A-1	DIRECT FIRE IMPACT AREA	CONFIRMED	85.00
A-2	DIRECT FIRE & COMBAT TRAINING AREA	CONFIRMED	40.00
B	INDIRECT FIRE IMPACT AREA	POTENTIAL	370.00
C-1	BUFFER ZONE	POTENTIAL	850.00
C-2	BUFFER ZONE & COMBAT TRNG. AREA	POTENTIAL	20.00
D	COMBAT TRAINING AREA	POTENTIAL	40.00
E	ALL REMAINING LAND	UNCONTAMINATED	222.87
F	IMPACT/ BUFFER AREA (ADDITIONAL ACREAGE)	POTENTIAL	960.00
TOTAL ACREAGE:			(FDE) 11,627.87
ADDITIONAL ACREAGE:			960.00

- LEGEND:
- 1943 SITE BOUNDARY
 - - - 1958 SITE BOUNDARY
 - - - OLYMPIC NATIONAL PARK BOUNDARY
 - x APPROXIMATE LOCATION OF OLD SCHOOL HOUSE
 - AREA OF HEAVY CONTAMINATION
 - APPROXIMATE LOCATION OF MOVING TARGET (THEORIZED)
 - SWAGERTY ACCIDENT LOCATION
 - FIRING POINT (THEORIZED)


	US Army Corps of Engineers Rock Island District	Designed By: M. J. CIVIS	Date:
		Drawn By: J. D. TURNER	Scale: AS SHOWN
		Checked By: G. C. OFSLAGER	Drawing Code:
		Reviewed By: D. J. HOLMES	Project Number: F10WAD03301

U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS FORMER PORT ANGELES COMBAT RANGE PORT ANGELES, WASHINGTON	Sheet Reference Number: PLATE 5
D. E. PROJECT AREAS	Sheet 5 of 8



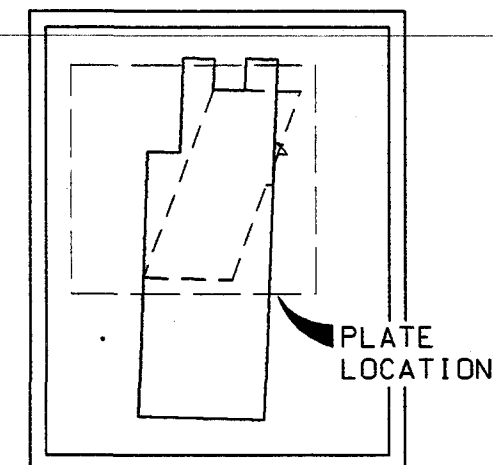
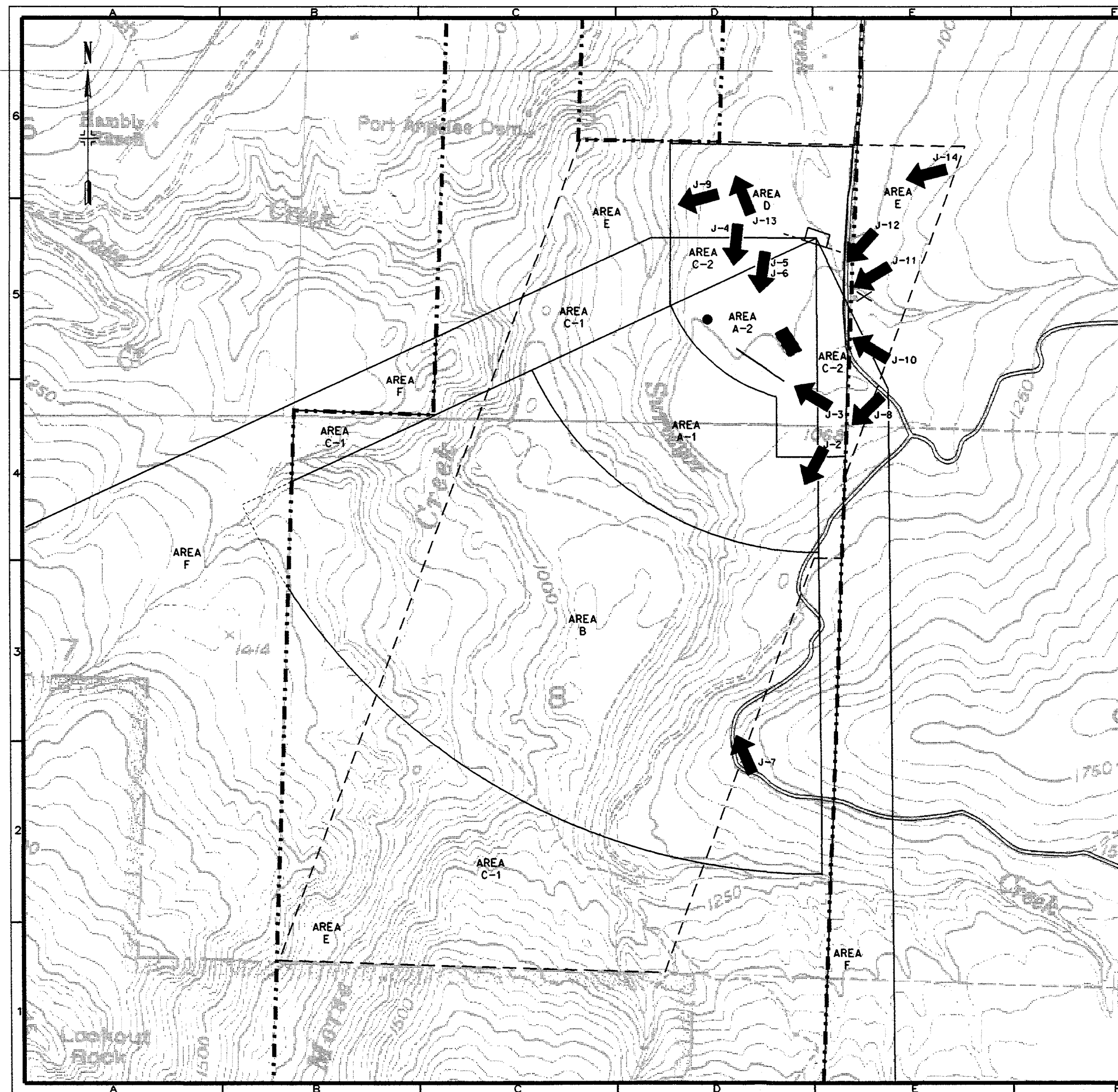
LEGEND:

- 1943 SITE BOUNDARY
- - - 1958 SITE BOUNDARY
- × APPROXIMATE LOCATION OF OLD SCHOOL HOUSE
- AREA OF HEAVY CONTAMINATION
- FIRING POINT
- APPROXIMATE LOCATION OF MOVING TARGET
- IMPACT AREA
- - - BUFFER ZONE
- SWAGERTY ACCIDENT LOCATION
- ORCHARD

	Designed By:	M. J. CIVIS	Date:
	Drawn By:	J. D. TURNER	Scale:
	Checked By:	G. C. OFSLAGER	Drawing Code:
	Reviewed By:	D. J. HOLMES	Project Number:
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS		Sheet Reference Number:	
FORMER PORT ANGELES COMBAT RANGE PORT ANGELES, WASHINGTON		PLATE 7	
AERIAL PHOTO 1939		Sheet 7 of 8	

500 250 0 500 1,000 FT.

11-07-1958 13101
at:proj:eng:fig:1p07.dgn



KEY PLAN
(NOT TO SCALE)

LEGEND:

- 1943 SITE BOUNDARY
- - - 1958 SITE BOUNDARY
- × APPROXIMATE LOCATION OF OLD SCHOOL HOUSE
- AREA OF HEAVY CONTAMINATION/ KNOWN DISTANT TARGET
- APPROXIMATE LOCATION OF MOVING TARGET (THEORIZED)
- SWAGGERTY ACCIDENT LOCATION
- ← PHOTO LOCATIONS

NOTES:

1. J-1 TAKEN FROM OLYMPIC MOUNTAIN.

0 250 0 500 1000 FT.

	Designed By:	Date:
	M. J. CIVIS	
	Drawn By:	Scale:
	J. D. TURNER	AS SHOWN
Checked By:	Drawing Code:	
G. C. OFSLAGER		
Reviewed By:	Project Number:	
D.J. HOLMES	F10WA003301	
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS FORMER PORT ANGELES COMBAT RANGE PORT ANGELES, WASHINGTON		Sheet Reference Number: PLATE 8 Sheet 8 of 8
PHOTO LOCATIONS		